Bijlage 1: ANSYS Script

In deze bijlage is de ANSYS script opgenomen. Dit script kan ieder keer veranderd worden om de gewenste data te genereren met ANSYS. De variabelen zijn:

Punt last (P), Elasticiteit modulus (E), poisson ratio (nu), dikte van de constructie (t), diameter van het gebied waar de punt last op werkt (d), krommingen 1 en 2.

De waarde van ‘’h1’’ (element grootte in het middelste stuk van de mesh) en ‘’hn’’ (grootte van de rand elementen) zijn eerst geoptimaliseerd en worden in dit script voor alle berekeningen constant gehouden en niet veranderd. Voor de Analyse en optimalisatie stappen wordt verwezen naar bijlage 3.

```
 ! ANSYS macro
! Generate a paraboloid with distributed point load and compute the deflection and moments
! P.C.J. Hoogenboom, September 2011
*CFOPEN,out,txt                          ! open file called out.txt
*DO,i,1,10
  P  = 1e3                               ! point load [N]
  E  = 1e3                               ! Young's modulus [N/mm2]
  nu = 0                                 ! Poison's ratio [-]
  !k1 = 1/30                             ! largest principal curvature [1/mm]
  !k2 = 1/2000                           ! smallest principal curvature [1/mm]
  t  = 40                                ! thickness [mm]
  d  = t                                 ! diameter of the load area [mm]
  k1 = 0.0005                            ! curvature 1
  k2 = 0.001+0.002*i                     ! curvature 2
  g  = 10*(sqrt(t/k1))                   ! radius of the base plane of the paraboloid [mm]
  h1 = 0.1                               ! centre element size [mm]
  hn = 30                                ! edge element size [mm]

  /PREP7                                 ! Open the preprocessing section of ANSYS
  MPTEMP,,,,,,,,                         ! material: isotropic
  MPTEMP,1,0
  MPDATA,EX,1,,E
  MPDATA,PRXY,1,,nu
  ET,1,SHELL181                          ! element type: 4 node quadrilateral
  R,1,t,t,t,t, , ,                       ! element thickness
  N,,0,0,0,,,                            ! insert node in origin
  q=P/(3.1415/4*d*d)                     ! distributed load
  f=q*3.1415*(h1/2)*(h1/2)               ! impose load on this node
  F,1,FZ,f
  m=6                                    ! number of nodes in a ring
  r=0
  parm=1
  *DOWHILE,parm                          ! for all rings while r <= g
   hi=hn*r/g                             ! ring thickness
```

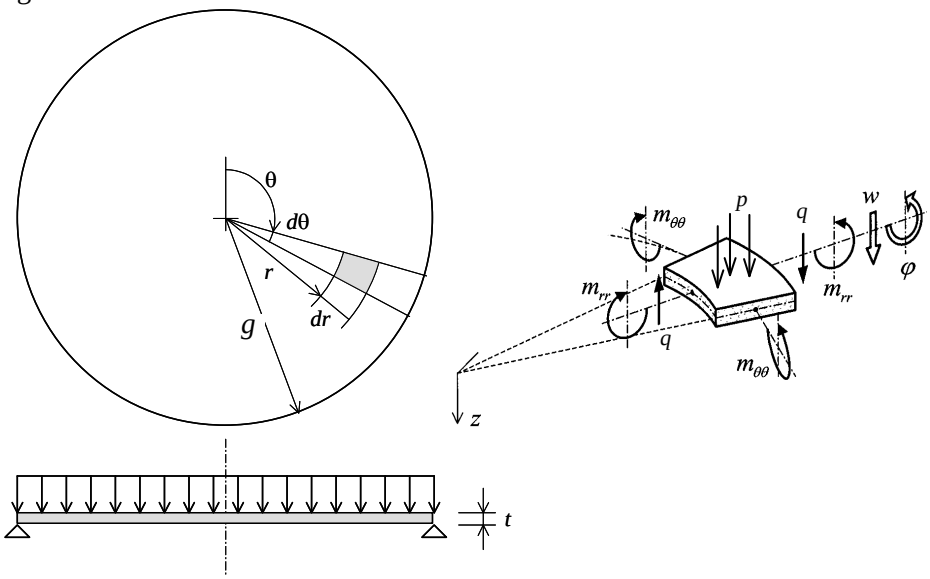
```
*IF,hi,LT,h1,THEN
 hi=h1
*ENDIF
r=r+hi                                  ! ring radius
*IF,r,GT,g,THEN
 ! r=g
 parm=-1
*ENDIF
mm=2*3.1415*r/hi                        ! ideal number of nodes in a ring
*IF,ABS(mm-m),GT,ABS(mm-2*m),THEN
  m=2*m                                 ! double number of nodes as previous ring
  v=1
*ELSE
  v=0
*ENDIF
*DO,j,1,m                               ! for all nodes in the ring
  x=r*sin(2*3.1415*j/m)                 ! node coordinates
  y=r*cos(2*3.1415*j/m)
  z=0.5*(k1*x*x+k2*y*y)
  N,,x,y,z,,,                           ! insert node
*ENDDO
*GET,k,NODE,,NUM,MAX                    ! maximum node number

ri=r-hi/2                               ! impose load on the nodes
*IF,ri,LT,d/2,THEN
 ro=r+hi/2
 *IF,ro,GT,d/2,THEN
  ro=d/2
 *ENDIF
 f=3.1415*(ro*ro-ri*ri)*q/m
 *DO,j,k-m+1,k
  F,j,FZ,f
 *ENDDO
*ENDIF


*IF,m,EQ,6,THEN
 E,2,3,1,1                              ! insert elements in the first ring
 E,3,4,1,1
 E,4,5,1,1
 E,5,6,1,1
 E,6,7,1,1
 E,7,2,1,1
```

```
 *ELSE
  *IF,v,EQ,1,THEN                    ! insert elements in the rings with triangles
   E,k,k-m+1,k-m,k-m
   E,k-m+1,k-m-m/2+1,k-m,k-m
   E,k-m+1,k-m+2,k-m-m/2+1,k-m-m/2+1
   *DO,j,2,m/2
    E,k-m-2+2*j,k-m-1+2*j,k-m-m/2-1+j,k-m-m/2-1+j
    E,k-m-1+2*j,k-m-m/2+j,k-m-m/2-1+j,k-m-m/2-1+j
    E,k-m-1+2*j,k-m+2*j,k-m-m/2+j,k-m-m/2+j
   *ENDDO
  *ELSE                              ! insert elements in the rings with quadrilaterals
   E,k,k-m+1,k-2*m+1,k-m
   *DO,j,2,m
    E,k-m-1+j,k-m+j,k-2*m+j,k-2*m-1+j
   *ENDDO
  *ENDIF
 *ENDIF
*ENDDO
*DO,j,k-m+1,k                        ! impose zero translations at the edge nodes
 D,j,,0,,,,UX,UY,UZ,,,
*ENDDO
FINISH

/SOLU                                ! perform analysis
SOLVE
FINISH

/POST1
*GET,uz,NODE,1,u,z                   ! obtain the deflection uz in the origin
SHELL,TOP
*GET,sxxt,NODE,1,S,X                 ! obtain the stress sxx in the origin in the bottom of the shell (z<0)
SHELL,BOT
*GET,SXXb,NODE,1,S,X                 ! obtain the stress sxx in the origin in the top of the shell (z>0)
SHELL,TOP

*GET,SYYt,NODE,1,S,Y                 ! obtain the stress syy in the origin in the bottom of the shell (z<0)
SHELL,BOT
*GET,Syyb,NODE,1,S,Y                 ! obtain the stress syy in the origin in the top of the shell (z>0)
nxx=(sxxt+sxxb)*t/2
nyy=(syyt+syyb)*t/2
mxx=(sxxt-sxxb)*t*t/12
myy=(syyt-syyb)*t*t/12
*VWRITE,uz                           !,nxx,nyy,mxx,myy
```

```
(F13.5,F13.5,F13.5,F13.5,F13.5)
FINISH

/CLEAR,NOSTART

*ENDDO

*CFCLOS                         ! close file out.txt
*UILIST,out.txt                 ! pop up out.txt
```

Bijlage 2: Differentiaal vergelijking voor het plat vlak

Differential vergelijking voor een cirkelvormige plaat (vlakke plaat zonder krommingen)
Om de ANSYS file (ANSYS script) te controleren en om er zeker van te zijn dat de waardes van ANSYS goed zijn, moet het script eerst geijkt worden. Heelaas zijn er nog geen formules die de invloed van krommingen in rekening brengen. Er bestaat echter wel een formule voor een plaat zonder krommingen (dus een vlakke plaat).
Om ANSYS te controleren wordt dus eerst een waarde van nul bij beide krommingen ingevuld in ANSYS script (dus k1 = k2 = 0). Dit beschrijft als het ware een plaat die vlak is en bestaat uit een grondvlak met straal g. Voor dit soort plaat constructies bestaat nu wel een differentiaal vergelijking. Deze diff. Vergelijking wordt dus gebruikt om ANSYS te controleren.
Hieronder is de diff. Vergelijking geïntroduceerd.
Een ronde plaat met een grond straal ‘’g’’ en een dikte ‘’t’’ die opgelegd is aan de randen is afgebeeld in figuur hieronder.



De plaat wordt belast met een punt last ‘’P’’ in het midden . De puntlast wordt uitgesmeerd over een cirkelvormige oppervlakte met een diameter "d". De differentiaal vergelijking die hiervoor gebruikt wordt is als volgt:

$$\frac{d^4w}{dr^4}+\frac{2}{r}\frac{d^3w}{dr^3}-\frac{1}{r^2}\frac{d^2w}{dr^2}+\frac{1}{r^3}\frac{dw}{dr}=\frac{p}{D},$$

w	Verplaatsing onder belasting
t	Dikte van de plaat
g	Grond straal
P	Belasting (puntlast)

De waarde van D is afhankelijk van elasticiteit modulus, dikte en dwarscontractie coëfficiënt. D is gelijk aan: $D=\frac{Et^3}{12(1-\nu^2)}$.

Voor P geldt verder dat:

$$p = \frac{P}{\frac{1}{4}\pi d^2} \quad if \quad 0 \le r < \frac{d}{2}$$

$$p = 0 \quad if \quad \frac{d}{2} \le r \le g$$

Om deze differentiaal vergelijkingen op te lossen zijn er randvoorwaarden nodig. Die zijn als volgt:
Als men kijkt naar een kleine deel element dr, dan zijn de krommingen in de vlakke plaat:

$$\kappa_{rr} = -\frac{d^2 w}{dr^2}$$

$$\kappa_{\theta\theta} = -\frac{1}{r}\frac{dw}{dr}$$

De momenten in de plaat zijn dan:

$$m_{rr} = D(\kappa_{rr} + \nu\kappa_{\theta\theta})$$

$$m_{\theta\theta} = D(\kappa_{\theta\theta} + \nu\kappa_{rr})$$

De dwarskracht in de plaat is dan: $pr = -\frac{d}{dr}(rq)$

De rand voorwaardes zijn:

$$r = g \rightarrow w = 0, m_{rr} = 0$$

$$r = 0 \rightarrow \frac{dw}{dr} = 0, q = 0$$

De verplaatsing van de middenpunt van de plaat is hiermee te berekenen:

$$\hat{w} = \frac{P}{16\pi D}\left(g^2 \frac{3+\nu}{1+\nu} - \frac{d^2}{16}\left(\frac{7+3\nu}{1+\nu} + 4\ln\frac{2g}{d} \right) \right).$$

De momenten in de middenpunt van de plaat is dan gelijk aan:

$$\hat{m}_{rr} = \hat{m}_{\theta\theta} = \frac{P}{4\pi}\left((1+\nu)\ln\frac{2g}{d} + 1 - \frac{1-\nu}{16}\frac{d^2}{g^2} \right).$$

Bijlage 3: Onderzoek naar optimale waarde van "hn" en "h1" voor koepels

In dit stukje wordt onderzocht wat de optimale waardes zijn voor de parameter ''h1'' en ''hn'' zodat de oplossing die ANSYS geeft zo nauwkeurig mogelijk is.
Hierbij zijn een aantal parameters eerst vast gelegd en die blijven gedurende de hele analyse constant.

P=1000 [N] (de puntlast)
E=1000 [N/mm^2] (de Elastisiteitsmodulus)
nu=0 [-] (de dwarscontractie coëfficiënt of de poisson ratio)
h1=0.1 [mm] (de grootte van de elementen in het midden van de cirkels die door ANSYS getekend worden)

Eerst wordt er onderzocht welke waarde van'' hn'' bij een plat vlak de beste oplossing zou geven bij verschillende ''g''. We laten daarom ''g'' variëren van 100 tot 1000 in stapjes van 100 mm. Hierbij zijn de krommingen in beide richtingen constant en gelijk aan nul. Daarom mag nu de differentiaal vergelijking opgelost worden om de verplaatsing van een vlak plaat t.g.v. een punt last te onderzoeken. De verwachting is dat ANSYS en diff.Vergelijking allebei het zelfde antwoord geven. Eerst wordt de invloed van ''hn'' onderzocht door ''hn'' steeds kleiner te maken en kijken wat er met de uitkomsten gebeurt.

	hn =30 K1 = 0.0 K2 = 0.0 t=1			Hn = 15 K1=0.0 K2 = 0.0 t=1		
g	W (ANSYS)	W (Diff)	Verschil in %	W (ANSYS)	W (Diff)	Verschil in %
100	6974.63391	7165.18421	2.660	7182.21418	7165.18421	0.238
200	28723.60632	28661.95862	0.215	28668.20768	28661.95862	0.0218
300	64630.50063	64489.95939	0.218	64502.44805	64489.95939	0.0194
400	114666.76034	114649.1778	0.0153	114612.01716	114649.1778	0.0324
500	179168.34828	179139.6104	0.016	179080.75149	179139.6104	0.0329
600	258003.38995	2.58003.390	0.016	257875.85145	258003.390	0.0494
700	350993.60300	351114.113	0.0343	350952.68754	351114.113	0.0460
800	458441.46531	458598.181	0.0341	458386.86265	458598.181	0.0460
900	580215.55755	580413.461	0.0341	580145.56978	580413.461	0.0462
1000	716316.16319	716560	0.0340	716228.80437	716560	0.0462

	hn =10 K1 = 0.0 K2 = 0.0 t=1			Hn = 5 K1=0.0 K2 = 0.0 t=1		
g	W (ANSYS)	W (Diff)	Verschil in %	W (ANSYS)	W (Diff)	Verschil in %
100	7182.75183	7165.18421	0.2452	7168.52950	7165.18421	0.0467
200	28668.83890	28661.95862	0.024	28654.67024	28661.95862	0.0254
300	64470.31465	64489.95939	0.0305	64462.53889	64489.95939	0.0425
400	114612.70913	114649.1778	0.0318	114598.56118	114649.1778	0.0441
500	179058.69043	179139.6104	0.0452	179053.42883	179139.6104	0.0481
600	257843.77038	258003.390	0.0619	257836.01620	258003.390	0.0650
700	350953.39590	351114.113	0.04577	350942.67208	351114.113	0.0488
800	458387.54442	458598.181	0.0460	458373.43684	458598.181	0.0490
900	580146.32443	580413.461	0.0460	580128.09338	580413.461	0.0492
1000	716206.66732	716560	0.0493	716242.56836	716560	0.0443

Het is snel te zien dat bij hn=30 ,(en g groter dan 200!) de meest nauwkeurige oplossing verkregen wordt. Verder is te zien dat de oplossingen van hn= 15, hn=10 en hn=5 bijna hetzelfde zijn. Die schommelen tussen de waardes van 0.020 % tot 0.045%.
Daarom wordt hier voor de volgende analyses alleen gekeken naar hn = 30 en hn=15. Kleinere waardes van hn=15 zijn toch ongeveer even nauwkeurig als 15!.
Nu wordt onderzocht wat de invloed van h1 is op de uitkomsten. (hn is het edge element size) . Eerst met h1 =0.05 . dus h1 wordt gehalveerd. Dan wordt h1 twee keer groter gemaakt om de invloed daarvan te onderzoeken.

	hn =30 K1 = 0.0 K2 = 0.0 t=1 h1=0.05			Hn = 15 K1=0.0 K2 = 0.0 t=1 h1=0.05		
g	W (ANSYS)	W (Diff)	Verschil in %	W (ANSYS)	W (Diff)	Verschil in %
100	6976.09621	7165.18421	2.639	6928.91217	7165.18421	3.297
200	27710.58954	28661.95862	3.319	28668.15163	28661.95862	0.0218
300	64630.37819	64489.95939	0.218	64502.40223	64489.95939	0.0193
400	114666.81422	114649.1778	0.0154	114611.99970	114649.1778	0.0324
500	179168.31220	179139.6104	0.016	179080.73312	179139.6104	0.0329
600	258003.34655	2.58003.390	0.016	257875.82577	258003.390	0.0494
700	350993.61433	351114.113	0.0343	350952.70162	351114.113	0.0460
800	458441.42114	458598.181	0.0341	458386.87928	458598.181	0.0460
900	580215.51871	580413.461	0.0341	580145.52851	580413.461	0.0462
1000	716316.21981	716560	0.0340	716228.81710	716560	0.0462

	hn =30 K1 = 0.0 K2 = 0.0 t=1 h1=0.2			Hn = 15 K1=0.0 K2 = 0.0 t=1 h1=0.2		
g	W (ANSYS)	W (Diff)	Verschil in %	W (ANSYS)	W (Diff)	Verschil in %
100	7238.74799	7165.18421	1.0267	7182.32182	7165.18421	0.239
200	28723.82879	28661.95862	0.2154	28668.25854	28661.95862	0.0220
300	64630.74158	64489.95939	0.218	64502.56483	64489.95939	0.0195
400	114667.00815	114649.1778	0.0154	114612.11686	114649.1778	0.0323
500	179168.45889	179139.6104	0.016	179080.87881	179139.6104	0.0329
600	258003.60156	2.58003.390	0.016	257875.97945	258003.390	0.0494
700	350993.76060	351114.113	0.0343	350952.81469	351114.113	0.0460
800	458441.56462	458598.181	0.0341	458387.00262	458598.181	0.0460
900	580215.73428	580413.461	0.0341	580145.69029	580413.461	0.0462
1000	716316.29529	716560	0.0340	716229.0030	716560	0.0462

Alleen bij g=100 en g=200 zien we kleine verschillen met de echte waardes van de diff. Vergelijking. Daarom gaan we ervan uit dat een waarde van h1=0.1 optimaal is.

Conclusie:
G moet groter zijn dan 300. h1= 0.1 en hn = 30 zijn de optimale waardes voor ANSYS script en zullen verder in het onderzoek constant blijven.

Bijlage 4: Onderzoek naar de juiste waarde van "g" voor koepels

Als op een schaal constructie een kleine kracht wordt aangebracht (een puntlast) dan zal de constructie, rondom en net onder de puntlast vervormen. De vervorming dempt dan verder uit als er naar een voldoende grote afstand van de puntlast gekeken wordt. De opdracht is nu om een ''g'' te vinden zodanig dat de vervorming van de constructie (t.g.v. de puntlast) binnen de ''g'' al uitgedempt is. Dat de vervorming net binnen het invloedgebied uitdempt. Dus dat de waarde van ''g'' verder geen invloed meer heeft op de vervorming van de constructie.
Om dat te onderzoeken wordt hier gekeken naar verschillende waardes van ''g''. ''g'' wordt hier steeds veranderd van 100 tot 1000 mm (bij verschillende waardes van de krommingen) en de verandering in de verplaatsing wordt bij ieder stap opgemeten. Als de verandering in de uitkomsten niet groot zijn, dan kan er geconcludeerd worden dat de ''g'' groot genoeg gekozen is.
Veranderingen ten opzichte van de vorige waarde wordt berekend door de waarde bij een stap groter te nemen, minus de vorige en dat delen door de vorige waarde steeds. En de oplossing daarvoor * 100.
Dus:

$$\Delta w = \frac{w(j+1) - w(j)}{w(j)} \cdot 100\,\%$$

In de volgende tabellen worden eerst verschillende ''g'' onderzocht voor gelijke waarde van krommingen. Dus k1 = k2.

0.0001-0.0009

	hn =30 K1 = 0.0001 K2 = 0.0001 t=1	Δw %	Hn = 30 K1=0.0002 K2 = 0.0002 t=1	Δw %	Hn = 30 K1=0.0003 K2 = 0.0003 t=1	Δw %
g	w		w		w	
100	3690.75873* (3829.62107) #15		1793.58602* (1875.90577)#1 5		1155.44050* (1213.95320)#1 5	
200	3675.24211* (3687.80710) #15		2010.98626* (2016.12929)#1 5		1389.23700* (1392.21356)#1 5	
300	4077.00705		2115.53105		1421.08098	
400	4222.37739	3.5	2138.76599	0.47	1432.35705	0.27
500	4262.13453	0.94	2148.72384	0.25	1436.93293	0.17
600	4282.61716	0.48	2154.20453		1439.38983	0.14
700	4296.80916	0.33	2158.13134		1441.31470	
800	4305.23380	0.19	2160.24110	0.067	1442.27555	0.0458
900	4310.94760	0.0941	2161.68485	0.047	1442.93630	0.0329
1000	4315.00224		2162.71643		1443.41098	

	Hn = 30 K1=0.0004 K2 = 0.0004 t=1	Δw %	Hn = 30 K1=0.0005 K2 = 0.0005 t=1	Δw %
g	w		w	
100	874.36278* (920.07414)#15		717.57125* (754.84280)#15	
200	1054.54574* (1056.90509)#15		848.38766* (850.40579)#15	
300	1070.02685		858.26398	
400	1076.97555	0.241	863.01095	0.197
500	1079.57951	0.131	864.70990	0.110
600	1080.99191	0.11	865.63814	0.107
700	1082.18361		866.47452	
800	1082.74209	0.036	866.84636	0.030
900	1083.12862	0.026	867.10576	0.022
1000	1083.40825		867.29510	

	hn =30 K1 = 0.0006 K2 = 0.0006 t=1	Δw %	Hn = 30 K1=0.0007 K2 = 0.0007 t=1	Δw %
g	w		w	
100	614.55641* (645.70715)#15		539.39558* (565.94431)#15	
200	709.47692* (711.23667)#15		609.69251* (611.24605)#15	
300	716.57744		615.10757	
400	720.06542	0.092	617.81529	0.148
500	721.27381	0.092	618.72672	0.081
600	721.93805		619.23120	
700	722.57273		619.73908	
800	722.84299	0.026	619.94808	0.024
900	723.03335	0.019	620.09695	0.018
1000	723.17380		620.20818	

	Hn = 30 K1=0.0008 K2 = 0.0008 t=1	Δw %	Hn = 30 K1=0.0009 K2 = 0.0009 t=1	Δw %
g	w		w	
100	480.93214* (503.97103)#15		433.65353* (453.98844)#15	
200	534.57820* (535.96350)#15		475.99664* (477.24215)#15	
300	538.85833		479.46717	
400	541.04807	0.133	481.29309	0.381
500	541.76582	0.074	481.87747	0.12
600	542.16627		482.20642	
700	542.58857		482.56790	
800	542.75793	0.023	482.71025	0.022
900	542.88009	0.017	482.81435	0.016
1000	542.97264		482.89441	

0.001-0.009

	hn =30 K1 = 0.001 K2 = 0.001 t=1	Δw %	Hn = 30 K1=0.002 K2 = 0.002 t=1	Δw %	Hn = 30 K1=0.003 K2 = 0.003 t=1	Δw %
g	w		w		w	
100	394.47019 * (413.075)# 15		203.72198* (213.4098)#15		137.00204* (144.031)#15	
200	429.02867		216.40115		145.03767	
300	431.90067		217.27143		145.52441	0.28
400	433.45946	0.11	217.88776	0.089	145.92696	0.09
500	433.94808	0.046	218.06658	0.055	146.05816	
600	434.22583	0.073	218.18736		146.15500	
700	434.54235	0.028	218.34684		146.28541	
800	434.66558	0.023	218.41630	0.027	146.35558	0.044
900	434.76704	0.014	218.47545	0.024	146.41987	0.041
1000	434.82847		218.52794		146.48028	

	Hn = 30 K1=0.004 K2 = 0.004 t=1	Δw %	Hn = 30 K1=0.005 K2 = 0.005 t=1	Δw %
g	w		w	
100	103.39914* (108.34653)#15		83.14795* (87.1399)#15	
200	109.27024		87.78562	
300	109.62115		88.07659	
400	109.94100	0.11	88.35807	0.14
500	110.06204	0.09	88.48146	0.12
600	110.16004		88.58754	
700	110.28588		88.71752	
800	110.36561	0.068	88.80966	0.100
900	110.44120	0.066	88.89861	0.098
1000	110.51406		88.98543	

	hn =30 K1 = 0.006 K2 = 0.006 t=1	Δw %	Hn = 30 K1=0.007 K2 = 0.007 t=1	Δw %	Hn = 30 K1=0.008 K2 = 0.008 t=1	Δw %
g	w		w		w	
100	69.61541		59.92525		52.64375	
200	73.45546		63.21858		55.54235	
300	73.71785		63.46795		55.78738	
400	73.98092	0.177	63.72323	0.222	56.04122	0.273
500	74.11195	0.158	63.86460	0.203	56.19448	0.255
600	74.22908		63.99433		56.33772	
700	74.36730		64.14304		56.49828	
800	74.47313	0.139	64.26324	0.183	56.63327	0.235
900	74.57635	0.136	64.38124	0.181	56.76634	0.232
1000	74.67783		64.49776		56.89813	

	Hn = 30 K1=0.009 K2 = 0.009 t=1	Δw %
g	w	
100	46.97301	
200	49.57444	
300	49.82047	
400	50.07693	0.332
500	50.24306	0.313
600	50.40038	
700	50.57371	
800	50.72374	0.292
900	50.87208	0.289
1000	51.01928	

0.01-0.04

	hn =30 K1 = 0.01 K2 = 0.01 t=1	Δw %	Hn = 30 K1=0.02 K2 = 0.02 t=1	Hn = 30 K1=0.03 K2 = 0.03 t=1
g	w		w	w
100	42.43273		22.00017	15.24054
200	44.080309		23.44767	16.49733
300	45.05357		23.81024	17.00462
400	45.31541	0.397	24.18477	17.52273
500	45.49509	0.378	24.51327	18.00708
600	45.66687		24.83790	18.48883* (18.50051)#15
700	45.85361	0.360	25.17223	18.97811* (18.98304)#10
800	46.01887	0.336	25.49361* (25.49957)#15	19.45765* (19.46198)#10
900	46.18261	0.352	25.81422* (25.81971)#15	19.93667* (19.94059)#10
1000	46.34532		26.13433* (-)	20.41536* (-)

De waarde van de krommingen waren tot nu toe steeds gelijk aan elkaar. (k1=k2). In de volgende tabellen wordt nu verschillende krommingen tegen elkaar uitgezet. K1 en k2 worden nu steeds anders genomen. ($k1 \neq k2$)

g	K1	K2	w	Verschil %
500	0.0005	0.005	266.73429	0.74
600	0.0005	0.005	268.69804	
700	0.0005	0.005	270.92578	0.307
800	0.0005	0.005	271.75877	
900	0.0005	0.005	272.34826	0.161
1000	0.0005	0.005	272.78526	

g	K1	K2	w	Verschil %
500	0.0005	0.007	222.10953	1.027
600	0.0005	0.007	224.39139	
700	0.0005	0.007	227.07935	0.443
800	0.0005	0.007	228.08693	
900	0.0005	0.007	228.80690	0.235
1000	0.0005	0.007	229.34445	

g	K1	K2	w	Verschil %
500	0.0005	0.01	181.87643	1.394
600	0.0005	0.01	184.41141	
700	0.0005	0.01	187.57008	0.63
800	0.0005	0.01	188.75287	
900	0.0005	0.01	189.61065	0.341
1000	0.0005	0.01	190.25864	
1500	0.0005	0.01	192.445	0.198
2000	0.0005	0.01	193.3191	

g	K1	K2	w	Verschil %
500	0.0007	0.01	158.68904	0.788
600	0.0007	0.01	159.94003	
700	0.0007	0.01	161.64088	0.355
800	0.0007	0.01	162.21461	
900	0.0007	0.01	162.64074	0.204
1000	0.0007	0.01	162.97334	

Conclusie:
In het geval van koepels, blijft de uitkomst "w", bij het gebruik van g=500 of hoger, altijd een verschil kleiner dan 2% leveren. Hoe groter de ‘’g’’ gekozen wordt, hoe minder de relatieve fout ten gevolge van de eerst volgende waarde.

Voor de analyse van koepels wordt verder een waarde van <u>g=1000</u> aangenomen.

Hieronder worden nog grotere ‘’g’’ toegepast om te laten zien dat de oplossing bijna niet verandert als g groter dan 1000 gekozen wordt! Om rekentijd te verminderen is hier echter gekozen voor een waarde van ‘’g’’ die afhangt van de kromming. Hierdoor is de rekentijd vooral bij kleine krommingen veel minder dan het geval dat er met een constante g van bijvoorbeeld 3000 gerekend wordt.

K1 = 0.0005 k2=0.0005 t=1

g = 10*(sqrt(t/k1)) = 447	w= 864.06346
g = 20*(sqrt(t/k1)) = 894	w= 867.11113
g = 30*(sqrt(t/k1)) = 1341	w= 867.68049
g = 40*(sqrt(t/k1)) = 1789	w= 867.98520
g = 50*(sqrt(t/k1)) = 2236	w= 868.11939
g = 60*(sqrt(t/k1)) = 2683	w= 868.21270
g = 70*(sqrt(t/k1)) = 3130	w= 868.30512

K1 = 0.001 k2=0.001 t=1

g = 10*(sqrt(t/k1)) = 316	w= 432.83356
g = 20*(sqrt(t/k1)) = 632	w= 434.32985
g= 30*(sqrt(t/k1)) = 948	w= 434.79703
g = 40*(sqrt(t/k1)) = 1260	w= 434.96957
g = 50*(sqrt(t/k1)) = 1581	w= 435.11961
g = 60*(sqrt(t/k1)) = 1895	w= 435.20076
g = 70*(sqrt(t/k1)) = 2214	w= 435.27751
g = 80*(sqrt(t/k1)) = 2530	w= 435. 34670
g = 90*(sqrt(t/k1)) = 2846	w= 435.41702
g = 100*(sqrt(t/k1)) = 3160	w= 435.47928

k2= 0.005 k2=0.005 t=1

g = 10*(sqrt(t/k1)) = 131	w= 87.05182
g =20*(sqrt(t/k1)) = 282	w= 88.04069
g=30*(sqrt(t/k1)) = 425	w=88.40268
g = 40*(sqrt(t/k1)) = 565	w= 88.57428
g = 50*(sqrt(t/k1)) = 707	w= 88.72853
g = 60*(sqrt(t/k1)) = 850	w= 88.86746
g = 70*(sqrt(t/k1)) = 990	w= 89.00081
g = 80*(sqrt(t/k1)) = 1131	w= 89.10594

g = 90*(sqrt(t/k1)) = 1273 w= 89.23426
g = 100*(sqrt(t/k1)) = 1414 w= 89.34650

K1 = 0.01 k2=0.01 t=1

g = 10*(sqrt(t/k1)) = 100 w= 42.55362
g =20*(sqrt(t/k1)) = 200 w= 44.83839
g=30*(sqrt(t/k1)) = 300 w= 45.06199
g = 40*(sqrt(t/k1)) = 400 w= 45.35724
g = 50*(sqrt(t/k1)) = 500 w= 45.51764
g = 60*(sqrt(t/k1)) 600 w= 45.67153
g = 70*(sqrt(t/k1)) = 700 w= 45.89036
g = 80*(sqrt(t/k1)) = 800 w= 46.0383
g = 90*(sqrt(t/k1)) = 900 w = 46.18501
g =100*(sqrt(t/k1)) = 1000 w = 46.37939

K1 = 0.0005 k2=0.01

g = 10*(sqrt(t/k1)) = 447 w=180.2734
g =20*(sqrt(t/k1)) = 894 w= 189.63543
g=30*(sqrt(t/k1)) = 1341 w= 191.67058
g = 40*(sqrt(t/k1)) = 1789 w= 192.89034
g = 50*(sqrt(t/k1)) = 2236 w= 193.61585

Uit de bovenstaande gegevens is te zien dat bij het toepassen van g=1000, alleen bij hele kleine krommingen (k=0.0005), de uitkomsten blijven veranderen. Deze veranderingen zijn echter erg klein en waarschijnlijk zullen ze in de ruis van de formule verdwijnen.

Conclusie: g=1000 is een prima keuze voor koepels!

Bijlage 5: Eigenschappen formule die een verband beschrijft tussen de krommingen en vervorming bij koepels (DataFit analyse)

Equation ID: wortelfunctie
Model Definition:
w = a*(1/(k1*k2)^0.5)

Number of observations = 784
Number of missing observations = 0
Solver type: Nonlinear
Nonlinear iteration limit = 250
Diverging nonlinear iteration limit =10
Number of nonlinear iterations performed = 6
Residual tolerance = 0.0000000001
Sum of Residuals = 776.742753018732
Average Residual = 0.990743307421852
Residual Sum of Squares (Absolute) = 3805.20110510677
Residual Sum of Squares (Relative) = 3805.20110510677
Standard Error of the Estimate = 2.20448894901238
Coefficient of Multiple Determination (R^2) = 0.9997297592
Proportion of Variance Explained = 99.97297592%
Adjusted coefficient of multiple determination (Ra^2) = 0.9997294141
Durbin-Watson statistic = 0.319617942967594

Regression Variable Results

Variable	Value	Standard Error	t-ratio	Prob(t)
a	0.434817676843688	1.71664724029526E-04	2532.94717	0.0

68% Confidence Intervals

Variable	Value	68% (+/-)	Lower Limit	Upper Limit :
a	0.434817676843688	1.70823566881781E-04	0.434646853276806	0.434988500410569

90% Confidence Intervals

Variable	Value	90% (+/-)	Lower Limit	Upper Limit
a	0.434817676843688	2.82697467531823E-04	0.434534979376156	0.43510037431122

95% Confidence Intervals

Variable	Value	95% (+/-)	Lower Limit	Upper Limit
a	0.434817676843688	3.3697785326996E-04	0.434480698990418	0.435154654696958

99% Confidence Intervals

Variable	Value	99% (+/-)	Lower Limit	Upper Limit

a	0.434817676843688	4.43255483916639E-04	0.434374421359771
	0.435260932327604		

Variance Analysis

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob(F)
Regression	1	14076974.5058082	14076974.5058082	2896632.986	0
Error	783	3805.20110510677	4.85977152631772		
Total	784	14080779.7069133			

Bijlage 6: Vergelijking van de originele Datapunten en de koepelformule (met een vaste g = 1000)

In deze bijlage wordt de uitkomst van de koepelformule vergeleken met de uitkomst van ANSYS. Om dit te doen wordt ieder keer verschillende waardes voor E, P, K1, K2 ,t en v gekozen bij een vaste g=1000 mm. In de tabel hieronder zijn de originele datapunten opgenomen in het vakje "w (ANSYS)". Deze data gegevens zijn met behulp van ANSYS verkregen en zijn in de eerste instantie gebruikt om een formule voor koepels te vinden. in het vakje "w (formule)" staan de verplaatsingen die met de koepelformule zijn berekend. Hierbij kan men gelijk zien wat het verschil is tussen de echte waarde (verkregen door ANSYS) en de waarde die de formule geeft, en wat de afwijkingen zijn.

P= waarde van de punt last is variabel

E= waarde van de Elasticiteitsmodulus is variabel

K1, K2 = variabel in de range (1/2000) tot (1/100)

t= variabel afhankelijk van de eis: $(1/2000) \leq t*k \leq (1/30)$

v= 0 tot 0.49

P	E	k1	k2	t	v	w (Ansys)	w(formule)	Residual	% Error
1000	1000	0.0005	0.0005	1	0	867.2951	869.635354	-2.3402537	-0.2698
2000	1000	0.0005	0.0005	20	0	4.33986	4.34818	-0.00832	-0.1917
10000	1000	0.0005	0.0005	20	0	21.6993	21.7409	-0.0416	-0.1917
20000	1000	0.0005	0.0005	20	0	43.3986	43.4818	-0.0832	-0.1917
1000	2000	0.0005	0.0005	20	0	1.087045	1.08496	0.002085	0.1918
1000	2000	0.0005	0.0005	10	0.3	4.1509	4.1525119	-0.0016119	-0.0388
1000	1000	0.0006	0.0005	1	0	791.93267	793.864833	-1.9321634	-0.244
20000	200000	0.0006	0.0005	20	0.31	0.19014	0.18893	0.00121	0.63637
90000	20000	0.0006	0.0005	20	0	8.94477	8.93098	0.01379	0.15417
9000	20000	0.0006	0.0005	10	0.2	3.50701	3.500947	0.006063	0.17288
9000	20000	0.0006	0.0005	15	0.3	1.52111	1.516283	0.004827	0.31733
9000	20000	0.0006	0.0005	5	0.3	13.70035	13.6465	0.05385	0.39306
1000	1000	0.0006	0.0005	12	0.4	5.08174	5.071918	0.009822	0.19328
1000	1000	0.0007	0.0005	1	0	733.32162	734.976019	-1.6543992	-0.2256
30000	120000	0.0007	0.0005	3	0.2	20.04354	20.0077	0.03584	0.17881
20000	10000	0.0007	0.0005	8	0.3	22.05693	21.934456	0.122474	0.55526
20000	10000	0.0007	0.0005	13	0.4	8.04268	8.0021117	0.0405683	0.50441
2000	10000	0.0007	0.0005	15	0.49	0.57722	0.571648	0.005572	0.96532
10000	10000	0.0007	0.0005	18	0.35	2.14852	2.12950386	0.01901614	0.88508
1000	1000	0.0008	0.0005	1	0	686.05004	687.507113	-1.4570729	-0.2124
10000	10000	0.0008	0.0005	2	0.1	171.02965	171.017521	0.0121286	0.00709
20000	10000	0.0008	0.0005	5	0.2	54.20488	53.9005977	0.30428228	0.56136
20000	30000	0.0008	0.0005	7	0.25	9.13872	9.06153756	0.07718244	0.84457

1000	30000	0.0008	0.0005	15	0.3	0.09808	0.0972696	0.0008104	0.82627
1000	1000	0.0008	0.0005	17	0.35	2.25754	2.23321032	0.02432968	1.07771
30000	1000	0.0008	0.0005	10	0.4	190.87858	189.752104	1.1264758	0.59015
1000	1000	0.0009	0.0005	1	0	646.87405	648.187922	-1.3138722	-0.2031
3000	200000	0.0009	0.0005	3	0.1	1.07714	1.07491244	0.00222756	0.2068
30000	200000	0.0009	0.0005	5	0.15	3.86752	3.84537771	0.02214229	0.57252
300000	200000	0.0009	0.0005	7	0.2	19.61727	19.4456521	0.17161788	0.87483
300000	30000	0.0009	0.0005	10	0.25	63.21517	62.7932516	0.42191839	0.66743
900000	33000	0.0009	0.0005	12	0.3	118.20555	117.238622	0.9669277	0.81801
900000	33000	0.0009	0.0005	15	0.35	74.5567	75.0327183	-0.4760182	-0.6385
1000	1000	0.001	0.0005	1	0	613.71586	614.925056	-1.2091958	-0.197
2000	1000	0.001	0.0005	3	0.1	136.27847	135.966863	0.3116066	0.22865
2000	1000	0.001	0.0005	5	0.2	48.53198	48.2101602	0.32181979	0.66311
20000	33000	0.001	0.0005	7	0.25	7.44197	7.36807781	0.07389219	0.99291
20000	210000	0.001	0.0005	10	0.3	0.56394	0.55928939	0.00465061	0.82466
20000	210000	0.001	0.0005	14	0.35	0.28385	0.28049627	0.00335373	1.18151
1000	1000	0.0015	0.0005	1	0	501.08116	502.084206	-1.0030455	-0.2002
20000	1000	0.0015	0.0005	3	0.1	1112.9367	1110.16479	2.77192	0.24906
15000	1000	0.0015	0.0005	4	0.2	463.83221	461.290207	2.5420032	0.54804
1000	1000	0.0015	0.0005	5	0.25	19.61253	19.4557774	0.15675258	0.79925
1000	200	0.0015	0.0005	7	0.3	49.51559	48.9276299	0.58796014	1.18742
1000	200	0.0015	0.0005	10	0.35	23.83209	23.5665949	0.26549509	1.11402
2000	1000	0.0015	0.0005	6	0.4	25.93539	25.6621007	0.27328931	1.05373
1000	1000	0.002	0.0005	1	0	433.77706	434.817677	-1.0406168	-0.2399
1000	3000	0.002	0.0005	2	0.1	36.05796	36.0536592	0.00430084	0.01193
2000	3000	0.002	0.0005	3	0.2	31.65896	31.5645659	0.09439408	0.29816
3000	3000	0.002	0.0005	5	0.25	16.97431	16.8491975	0.1251125	0.73707
4000	3000	0.002	0.0005	7	0.3	11.42849	11.2993521	0.12913789	1.12996
150000	210000	0.002	0.0005	9	0.35	3.63916	3.5995185	0.0396415	1.0893
50000	33000	0.002	0.0005	10	0.4	6.1324	6.06109939	0.07130061	1.16269
1000	1000	0.0025	0.0005	1	0	387.73757	388.912753	-1.1751833	-0.3031
150000	210000	0.0025	0.0005	5	0.31	10.65032	10.5778792	0.07244084	0.68018
50000	33000	0.0025	0.0005	10	0.2	5.79588	5.77476942	0.02111059	0.36423
1000	1000	0.003	0.0005	1	0	353.67149	355.027147	-1.3556565	-0.3833
150000	210000	0.003	0.0005	2	0.31	60.32685	60.3514899	-0.0246399	-0.0408
50000	33000	0.003	0.0005	5	0.2	32.99854	32.9476195	0.05092047	0.15431
1000	1000	0.0035	0.0005	1	0	327.13178	328.691268	-1.5594882	-0.4767
150000	210000	0.0035	0.0005	2	0.31	55.78498	55.8746224	-0.0896424	-0.1607
50000	33000	0.0035	0.0005	5	0.2	30.48412	30.5035684	-0.0194484	-0.0638
1000	1000	0.004	0.0005	1	0	305.68746	307.462528	-1.7750679	-0.5807
150000	210000	0.004	0.0005	2	0.31	52.11019	52.2659234	-0.1557334	-0.2989

50000	33000	0.004	0.0005	2.5	0.2	72.78796	73.0456973	-0.2577373	-0.3541
1000	1000	0.0045	0.0005	1	0	287.88266	289.878451	-1.9957912	-0.6933
150000	210000	0.0045	0.0005	2	0.31	49.05563	49.2767852	-0.2211552	-0.4508
50000	33000	0.0045	0.0005	2.5	0.2	68.49687	68.8681439	-0.3712738	-0.542
1000	1000	0.005	0.0005	1	0	272.78523	275.002845	-2.2176151	-0.813
150000	210000	0.005	0.0005	2	0.31	46.46315	46.7480631	-0.2849131	-0.6132
50000	33000	0.005	0.0005	2	0.2	101.36934	102.084465	-0.7151253	-0.7055
1000	1000	0.0055	0.0005	1	0	259.76699	262.204925	-2.4379348	-0.9385
150000	210000	0.0055	0.0005	1.5	0.31	78.6479	79.240052	-0.592152	-0.7529
50000	33000	0.0055	0.0005	1.5	0.2	171.65013	173.037722	-1.387592	-0.8084
1000	1000	0.006	0.0005	1	0	248.38707	251.042103	-2.6550328	-1.0689
150000	210000	0.006	0.0005	1.5	0.31	75.1893	75.8665737	-0.6772737	-0.9008
50000	33000	0.006	0.0005	1.5	0.2	164.09234	165.671006	-1.5786657	-0.9621
1000	1000	0.0065	0.0005	1	0	238.32567	241.193451	-2.8677807	-1.2033
150000	210000	0.0065	0.0005	1.1	0.31	134.24023	135.539714	-1.2994843	-0.968
50000	33000	0.0065	0.0005	1.2	0.2	246.16438	248.705553	-2.5411727	-1.0323
1000	1000	0.007	0.0005	1	0	229.34441	232.419825	-3.0754146	-1.341
150000	210000	0.007	0.0005	1.1	0.31	129.19126	130.609337	-1.4180768	-1.0977
50000	33000	0.007	0.0005	1.2	0.2	236.87927	239.658667	-2.7793973	-1.1733
1000	1000	0.0075	0.0005	1	0	221.26143	224.538883	-3.2774528	-1.4813
150000	210000	0.0075	0.0005	1.1	0.31	124.64698	126.180607	-1.533627	-1.2304
50000	33000	0.0075	0.0005	1.2	0.2	228.52221	231.532269	-3.0100592	-1.3172
1000	1000	0.008	0.0005	1	0	213.93523	217.408838	-3.4736084	-1.6237
150000	210000	0.008	0.0005	1.1	0.31	120.52797	122.173847	-1.6458774	-1.3656
50000	33000	0.008	0.0005	1.2	0.2	220.9472	224.180156	-3.2329557	-1.4632
1000	1000	0.0085	0.0005	1	0	207.25383	210.917554	-3.6637241	-1.7677
150000	210000	0.0085	0.0005	1.1	0.31	116.77137	118.526042	-1.7546718	-1.5027
1000	1000	0.009	0.0005	1	0	201.12725	204.975019	-3.8477686	-1.9131
150000	210000	0.009	0.0005	1.05	0.31	124.40598	126.417955	-2.0119752	-1.6173
1000	1000	0.0095	0.0005	1	0	195.48228	199.508033	-4.0257529	-2.0594
1000	1000	0.01	0.0005	1	0	190.2586	194.456377	-4.1977766	-2.2064
1000	1000	0.015	0.0005	1	0	153.14703	158.772967	-5.6259367	-3.6736
1000	1000	0.02	0.0005	1	0	130.85134	137.501423	-6.6500826	-5.0822
1000	1000	0.025	0.0005	1	0	115.57157	122.985011	-7.4134412	-6.4146
1000	1000	0.03	0.0005	1	0	104.26507	112.269441	-8.0043714	-7.6769
1000	1000	0.0005	0.0006	1	0	791.93268	793.864833	-1.9321534	-0.244
1000	1000	0.0006	0.0006	1	0	723.1738	724.696128	-1.5223281	-0.2105
10000	33000	0.0006	0.0006	5	0.15	8.73026	8.68537975	0.04488025	0.51408
10000	3000	0.0006	0.0006	10	0.2	23.78582	23.6734244	0.11239556	0.47253
2000	3000	0.0006	0.0006	15	0.3	2.06678	2.05062316	0.01615684	0.78174
1000	1000	0.0007	0.0006	1	0	669.69692	670.938242	-1.2413216	-0.1854

2000	3000	0.0007	0.0006	5	0.1	17.90745	17.8022413	0.10520875	0.58751
2000	3000	0.0007	0.0006	10	0.2	4.41438	4.38346644	0.03091356	0.70029
2000	3000	0.0007	0.0006	15	0.3	1.92038	1.89850814	0.02187186	1.13893
1000	1000	0.0008	0.0006	1	0	626.568	627.605257	-1.0372569	-0.1655
20000	33000	0.0008	0.0006	4	0.1	23.77219	23.6540794	0.11811065	0.49684
20000	33000	0.0008	0.0006	8	0.2	5.87877	5.8243713	0.0543987	0.92534
20000	33000	0.0008	0.0006	12	0.3	2.55242	2.52257351	0.02984649	1.16934
1000	1000	0.0009	0.0006	1	0	590.82795	591.711911	-0.8839608	-0.1496
20000	33000	0.0009	0.0006	2	0.1	89.32211	89.2051195	0.11699047	0.13098
20000	33000	0.0009	0.0006	4	0.2	22.10822	21.9650797	0.14314032	0.64745
20000	33000	0.0009	0.0006	8	0.3	5.41503	5.3511865	0.0638435	1.17901
1000	1000	0.001	0.0006	1	0	560.58078	561.347207	-0.766427	-0.1367
1000	1000	0.001	0.0006	2	0.1	139.85789	139.635222	0.2226685	0.15921
1000	1000	0.001	0.0006	5	0.2	22.21162	22.0048269	0.20679313	0.93101
1000	1000	0.001	0.0006	10	0.3	5.43396	5.36086981	0.07309019	1.34506
1000	1000	0.0015	0.0006	1	0	457.86414	458.338075	-0.4739352	-0.1035
1000	1000	0.0015	0.0006	2	0.1	114.28797	114.011681	0.2762891	0.24175
1000	1000	0.0015	0.0006	4	0.2	28.32495	28.073228	0.25172203	0.88869
1000	1000	0.0015	0.0006	8	0.3	6.95666	6.83926855	0.11739145	1.68747
1000	1000	0.002	0.0006	1	0	396.51892	396.932417	-0.4134967	-0.1043
1000	1000	0.002	0.0006	2	0.1	98.99536	98.737012	0.25834798	0.26097
1000	1000	0.002	0.0006	4	0.2	24.54549	24.3121286	0.23336141	0.95073
1000	1000	0.002	0.0006	8	0.3	6.0346	5.92298031	0.11161969	1.84966
1000	1000	0.0025	0.0006	1	0	354.57667	355.027147	-0.4504765	-0.127
1500	33000	0.0025	0.0006	2	0.1	4.02389	4.01423038	0.00965962	0.24006
1500	33000	0.0025	0.0006	4	0.2	0.99781	0.98842859	0.00938141	0.9402
1500	33000	0.0025	0.0006	6	0.3	0.43553	0.42809492	0.00743508	1.70713
1000	1000	0.003	0.0006	1	0	323.55724	324.093961	-0.5367211	-0.1659
1500	33000	0.003	0.0006	2	0.1	3.67149	3.66447422	0.00701578	0.19109
1500	33000	0.003	0.0006	3	0.2	1.61389	1.60410262	0.00978738	0.60645
1500	33000	0.003	0.0006	4	0.3	0.88872	0.87928967	0.00943033	1.06111
1000	1000	0.0035	0.0006	1	0	299.40226	300.052703	-0.6504434	-0.2172
1500	33000	0.0035	0.0006	1.5	0.1	6.03164	6.03136691	0.0002731	0.00453
1500	33000	0.0035	0.0006	2	0.2	3.34993	3.3414985	0.0084315	0.25169
1500	33000	0.0035	0.0006	2.5	0.3	2.09461	2.08400396	0.01060604	0.50635
1000	1000	0.004	0.0006	1	0	279.89343	280.673604	-0.7801735	-0.2787
1500	33000	0.004	0.0006	1.5	0.1	5.63812	5.64182713	-0.0037071	-0.0658
1500	33000	0.004	0.0006	2	0.2	3.13121	3.12568563	0.00552437	0.17643
1500	33000	0.004	0.0006	2.5	0.3	1.95787	1.9494072	0.0084628	0.43225
1000	1000	0.0045	0.0006	1	0	263.70235	264.621611	-0.9192611	-0.3486
1500	33000	0.0045	0.0006	1.3	0.1	7.06891	7.08172939	-0.0128194	-0.1813

1500	33000	0.0045	0.0006	1.7	0.2	4.07951	4.07878848	0.00072152	0.01769
1500	33000	0.0045	0.0006	2	0.3	2.8771	2.87174803	0.00535197	0.18602
1000	1000	0.005	0.0006	1	0	249.97858	251.042103	-1.0635228	-0.4254
33000	33000	0.005	0.0006	1.3	0.1	147.41497	147.803005	-0.3880346	-0.2632
33000	33000	0.005	0.0006	1.5	0.2	109.21874	109.342864	-0.1241238	-0.1136
33000	33000	0.005	0.0006	1.7	0.3	82.96625	82.9568811	0.00936895	0.01129
1000	1000	0.0055	0.0006	1	0	238.14901	239.359253	-1.2102433	-0.5082
33000	33000	0.0055	0.0006	1.3	0.1	140.43029	140.924636	-0.4943456	-0.352
33000	33000	0.0055	0.0006	1.5	0.2	104.04202	104.25433	-0.21231	-0.2041
33000	33000	0.0055	0.0006	1.7	0.3	79.03402	79.0962827	-0.0622627	-0.0788
1000	1000	0.006	0.0006	1	0	227.8115	229.169038	-1.3575376	-0.5959
33000	33000	0.006	0.0006	1.3	0.1	134.32526	134.925066	-0.5998062	-0.4465
33000	33000	0.006	0.0006	1.5	0.2	99.51662	99.8159217	-0.2993017	-0.3008
33000	33000	0.006	0.0006	1.7	0.3	75.59605	75.7289251	-0.1328751	-0.1758
1000	1000	0.0065	0.0006	1	0	218.67438	220.178489	-1.5041094	-0.6878
3300	33000	0.0065	0.0006	1.1	0.1	18.00794	18.1056	-0.09766	-0.5423
3300	33000	0.0065	0.0006	1.2	0.2	14.91978	14.9843806	-0.0646005	-0.433
3300	33000	0.0065	0.0006	1.3	0.3	12.39811	12.4420481	-0.0439381	-0.3544
1000	1000	0.007	0.0006	1	0	210.52027	212.169301	-1.6490313	-0.7833
3300	33000	0.007	0.0006	1.1	0.1	17.33682	17.4469927	-0.1101727	-0.6355
3300	33000	0.007	0.0006	1.2	0.2	14.36371	14.4393104	-0.0756004	-0.5263
3300	33000	0.007	0.0006	1.3	0.3	11.93611	11.9894576	-0.0533476	-0.4469
1000	1000	0.0075	0.0006	1	0	203.18336	204.975019	-1.7916586	-0.8818
3300	33000	0.0075	0.0006	1.2	0.2	13.86332	13.9496991	-0.0863791	-0.6231
3300	33000	0.0075	0.0006	1.3	0.3	11.52035	11.5829165	-0.0625665	-0.5431
1000	1000	0.008	0.0006	1	0	196.53468	198.466208	-1.9315283	-0.9828
3300	33000	0.008	0.0006	1.1	0.2	15.96076	16.0741346	-0.1133746	-0.7103
3300	33000	0.008	0.0006	1.2	0.3	13.07672	13.1621785	-0.0854585	-0.6535
1000	1000	0.0085	0.0006	1	0	190.47218	192.540504	-2.0683236	-1.0859
33000	210000	0.0085	0.0006	1.1	0.2	24.30893	24.5051732	-0.1962432	-0.8073
33000	210000	0.0085	0.0006	1.15	0.3	21.68596	21.8486578	-0.1626978	-0.7502
1000	1000	0.009	0.0006	1	0	184.91391	187.115736	-2.2018257	-1.1907
33000	210000	0.009	0.0006	1.1	0.25	23.34045	23.5413641	-0.2009141	-0.8608
1000	1000	0.0095	0.0006	1	0	179.79316	182.125083	-2.3319233	-1.297
33000	210000	0.0095	0.0006	1.1	0.25	22.69572	22.9134812	-0.2177612	-0.9595
1000	1000	0.01	0.0006	1	0	175.05505	177.513573	-2.4585232	-1.4044
1000	1000	0.015	0.0006	1	0	141.39895	144.939226	-3.5402756	-2.5037
1000	1000	0.02	0.0006	1	0	121.17253	125.521051	-4.3485214	-3.5887
1000	1000	0.025	0.0006	1	0	107.2993	112.269441	-4.9701414	-4.632
1000	1000	0.03	0.0006	1	0	97.02274	102.487509	-5.4647693	-5.6325
1000	1000	0.0005	0.0007	1	0	733.32162	734.976019	-1.6543992	-0.2256

1000	1000	0.0006	0.0007	1	0	669.69692	670.938242	-1.2413216	-0.1854
1000	1000	0.0007	0.0007	1	0	620.20818	621.16811	-0.9599298	-0.1548
33000	210000	0.0007	0.0007	2	0.1	24.30935	24.2810358	0.02831423	0.11647
33000	210000	0.0007	0.0007	5	0.2	3.85805	3.8263984	0.0316516	0.8204
33000	210000	0.0007	0.0007	15	0.3	0.42083	0.41430958	0.00652042	1.54942
1000	1000	0.0008	0.0007	1	0	580.29484	581.049562	-0.7547216	-0.1301
33000	210000	0.0008	0.0007	2	0.1	22.75066	22.7128292	0.03783079	0.16628
33000	210000	0.0008	0.0007	5	0.2	3.61327	3.57926796	0.03400204	0.94103
33000	210000	0.0008	0.0007	13	0.3	0.52458	0.51597043	0.00860957	1.64123
1000	1000	0.0009	0.0007	1	0	547.22015	547.81878	-0.5986303	-0.1094
2000	210000	0.0009	0.0007	2	0.2	1.28156	1.27824477	0.00331523	0.25869
2000	210000	0.0009	0.0007	5	0.3	0.20157	0.19930184	0.00226816	1.12525
2000	210000	0.0009	0.0007	12	0.4	0.03398	0.03333291	0.00064709	1.90432
1000	1000	0.001	0.0007	1	0	519.22991	519.706527	-0.4766172	-0.0918
2000	210000	0.001	0.0007	2	0.2	1.2163	1.21264947	0.00365054	0.30013
2000	210000	0.001	0.0007	5	0.3	0.19142	0.18907432	0.00234568	1.22541
2000	210000	0.001	0.0007	10	0.4	0.04639	0.04553622	0.00085378	1.84043
1000	1000	0.0015	0.0007	1	0	424.19441	424.338603	-0.1441926	-0.034
2000	210000	0.0015	0.0007	2	0.2	0.99458	0.99012414	0.00445586	0.44801
2000	210000	0.0015	0.0007	5	0.3	0.15687	0.15437854	0.00249146	1.58823
2000	210000	0.0015	0.0007	6	0.4	0.10536	0.10327826	0.00208174	1.97584
1000	1000	0.002	0.0007	1	0	367.45723	367.48801	-0.0307796	-0.0084
2000	210000	0.002	0.0007	2	0.2	0.86207	0.85747266	0.00459734	0.53329
2000	210000	0.002	0.0007	3	0.3	0.37519	0.37137705	0.00381295	1.01627
2000	210000	0.002	0.0007	5	0.4	0.13125	0.12879589	0.00245411	1.8698
1000	1000	0.0025	0.0007	1	0	328.67957	328.691268	-0.0116982	-0.0036
2000	210000	0.0025	0.0007	2	0.2	0.7714	0.76694686	0.00445314	0.57728
2000	210000	0.0025	0.0007	3	0.3	0.33587	0.33216973	0.00370027	1.1017
2000	210000	0.0025	0.0007	4	0.4	0.18288	0.17999773	0.00288227	1.57604
1000	1000	0.003	0.0007	1	0	300.01062	300.052703	-0.0420834	-0.014
2000	210000	0.003	0.0007	2	0.2	0.7043	0.70012349	0.00417651	0.593
2000	210000	0.003	0.0007	3	0.3	0.30674	0.30322809	0.00351191	1.14491
1000	1000	0.0035	0.0007	1	0	277.69355	277.794824	-0.1012738	-0.0365
2000	210000	0.0035	0.0007	2	0.3	0.63594	0.63165299	0.00428701	0.67412
2000	210000	0.0035	0.0007	3	0.4	0.27368	0.27044596	0.00323404	1.18169
1000	1000	0.004	0.0007	1	0	259.675	259.853264	-0.1782636	-0.0686
2000	210000	0.004	0.0007	2	0.2	0.60975	0.60632473	0.00342527	0.56175
2000	210000	0.004	0.0007	2.5	0.3	0.38163	0.37814865	0.00348135	0.91223
1000	1000	0.0045	0.0007	1	0	244.72544	244.992006	-0.2665664	-0.1089
2000	210000	0.0045	0.0007	1.5	0.4	0.95691	0.95404366	0.00286635	0.29954
2000	210000	0.0045	0.0007	2	0.2	0.57465	0.57164844	0.00300156	0.52233

1000	1000	0.005	0.0007	1	0	232.05775	232.419825	-0.3620746	-0.156
2000	1000	0.005	0.0007	1.5	0.2	203.01052	202.463642	0.5468778	0.26938
2000	1000	0.005	0.0007	2	0.3	111.64631	110.980549	0.6657612	0.59631
1000	1000	0.0055	0.0007	1	0	221.14156	221.603608	-0.4620478	-0.2089
2000	1000	0.0055	0.0007	1.3	0.3	250.96473	250.451601	0.5131291	0.20446
2000	1000	0.0055	0.0007	1.8	0.4	126.37807	125.849056	0.529014	0.4186
1000	1000	0.006	0.0007	1	0	211.6047	212.169301	-0.5646013	-0.2668
2000	1000	0.006	0.0007	1.3	0.4	231.18105	231.001068	0.1799822	0.07785
2000	1000	0.006	0.0007	1.7	0.3	140.71775	140.222722	0.495028	0.35179
1000	1000	0.0065	0.0007	1	0	203.17729	203.845671	-0.668381	-0.329
2000	1000	0.0065	0.0007	1.2	0.2	277.42089	277.456814	-0.035924	-0.0129
2000	1000	0.0065	0.0007	1.6	0.3	152.45838	152.088094	0.3702859	0.24288
1000	1000	0.007	0.0007	1	0	195.6582	196.430604	-0.7724037	-0.3948
2000	1000	0.007	0.0007	1.2	0.2	267.17004	267.364076	-0.194036	-0.0726
2000	1000	0.007	0.0007	1.4	0.3	191.59322	191.419761	0.1734589	0.09053
1000	1000	0.0075	0.0007	1	0	188.89404	189.769992	-0.8759522	-0.4637
1000	1000	0.0075	0.0007	1.1	0.2	153.4515	153.698124	-0.2466244	-0.1607
1000	1000	0.0075	0.0007	1.2	0.3	125.78167	125.854498	-0.0728281	-0.0579
1000	1000	0.008	0.0007	1	0	182.7655	183.744005	-0.9785048	-0.5354
1000	1000	0.008	0.0007	1.1	0.2	148.48472	148.817569	-0.3328491	-0.2242
1000	1000	0.008	0.0007	1.2	0.3	121.71271	121.858094	-0.1453838	-0.1194
1000	1000	0.0085	0.0007	1	0	177.1782	178.257868	-1.0796682	-0.6094
1000	1000	0.0085	0.0007	1.05	0.2	157.96389	158.451556	-0.4876661	-0.3087
1000	1000	0.0085	0.0007	1.1	0.3	140.38978	140.691232	-0.3014519	-0.2147
1000	1000	0.009	0.0007	1	0	172.05636	173.235509	-1.1791491	-0.6853
1000	1000	0.009	0.0007	1.05	0.2	153.4109	153.987234	-0.5763336	-0.3757
1000	1000	0.009	0.0007	1.1	0.3	136.34716	136.727301	-0.3801409	-0.2788
1000	1000	0.0095	0.0007	1	0	167.33831	168.615063	-1.2767528	-0.763
1000	1000	0.0095	0.0007	1.05	0.3	145.52177	146.056694	-0.5349236	-0.3676
1000	1000	0.01	0.0007	1	0	162.97331	164.345634	-1.3723241	-0.8421
1000	1000	0.01	0.0007	1.1	0.3	129.17771	129.710907	-0.5331968	-0.4128
1000	1000	0.015	0.0007	1	0	131.97849	134.187648	-2.2091583	-1.6739
1000	1000	0.02	0.0007	1	0	113.35491	116.209912	-2.8550023	-2.5186
1000	1000	0.025	0.0007	1	0	100.57786	103.941305	-3.3634454	-3.3441
1000	1000	0.03	0.0007	1	0	91.10872	94.8849961	-3.7762761	-4.1448
1000	1000	0.0005	0.0008	1	0	686.05005	687.507113	-1.4570629	-0.2124
1000	1000	0.0006	0.0008	1	0	626.568	627.605257	-1.0372569	-0.1655
1000	1000	0.0007	0.0008	1	0	580.29484	581.049562	-0.7547216	-0.1301
1000	1000	0.0008	0.0008	1	0	542.97264	543.522096	-0.5494561	-0.1012
1000	33000	0.0008	0.0008	5	0.2	0.65267	0.64563885	0.00703115	1.07729
1000	33000	0.0008	0.0008	10	0.3	0.15989	0.15729212	0.00259788	1.62479

1000	1000	0.0009	0.0008	1	0	512.04465	512.437547	-0.3928965	-0.0767
1000	33000	0.0009	0.0008	5	0.2	0.61608	0.60871414	0.00736586	1.1956
1000	33000	0.0009	0.0008	10	0.3	0.1511	0.14829643	0.00280357	1.85544
1000	1000	0.001	0.0008	1	0	485.87139	486.140942	-0.2695516	-0.0555
1000	33000	0.001	0.0008	5	0.2	0.58507	0.57747694	0.00759306	1.2978
1000	33000	0.001	0.0008	10	0.3	0.14364	0.14068635	0.00295365	2.05629
1000	1000	0.0015	0.0008	1	0	397.01415	396.932417	0.0817333	0.02059
1000	33000	0.0015	0.0008	4	0.2	0.74668	0.73673117	0.00994883	1.33241
1000	33000	0.0015	0.0008	8	0.3	0.18414	0.17948425	0.00465575	2.52837
1000	1000	0.002	0.0008	1	0	343.9791	343.753556	0.2255436	0.06557
1000	33000	0.002	0.0008	4	0.2	0.64802	0.63802791	0.00999209	1.54194
1000	33000	0.002	0.0008	5	0.3	0.40661	0.39792108	0.00868892	2.13692
1000	1000	0.0025	0.0008	1	0	307.74166	307.462528	0.2791321	0.0907
1000	33000	0.0025	0.0008	2	0.2	2.30008	2.28267804	0.01740196	0.75658
1000	33000	0.0025	0.0008	4	0.3	0.56671	0.55611161	0.01059839	1.87016
1000	1000	0.003	0.0008	1	0	280.95798	280.673604	0.2843765	0.10122
20000	33000	0.003	0.0008	2	0.2	42.0157	41.6758085	0.33989153	0.80896
20000	33000	0.003	0.0008	3	0.3	18.31813	18.0500667	0.26806329	1.46338
1000	1000	0.0035	0.0008	1	0	260.11395	259.853264	0.2606864	0.10022
1000	1000	0.004	0.0008	1	0	243.28898	243.070471	0.2185092	0.08981
20000	33000	0.004	0.0008	1.5	0.3	62.93197	62.5272652	0.40470478	0.64308
20000	33000	0.004	0.0008	2	0.4	34.20318	33.8825757	0.32060435	0.93735
1000	1000	0.0045	0.0008	1	0	229.33312	229.169038	0.1640824	0.07155
1000	1000	0.005	0.0008	1	0	217.51023	217.408838	0.1013916	0.04661
20000	33000	0.005	0.0008	1.5	0.2	57.71295	57.3901199	0.32283013	0.55937
20000	33000	0.005	0.0008	2	0.3	31.76846	31.4584235	0.31003652	0.97593
1000	1000	0.0055	0.0008	1	0	207.3243	207.291194	0.033106	0.01597
1000	1000	0.006	0.0008	1	0	198.42732	198.466208	-0.0388883	-0.0196
20000	33000	0.006	0.0008	1.2	0.2	82.13348	81.8590188	0.27446117	0.33416
20000	33000	0.006	0.0008	1.5	0.3	51.37006	51.0532983	0.31676173	0.61663
1000	1000	0.0065	0.0008	1	0	190.56692	190.680165	-0.1132452	-0.0594
1000	1000	0.007	0.0008	1	0	183.55502	183.744005	-0.1889848	-0.103
20000	33000	0.007	0.0008	1.2	0.3	74.115	73.8533902	0.26160982	0.35298
1000	1000	0.0075	0.0008	1	0	177.24822	177.513573	-0.2653532	-0.1497
1000	1000	0.008	0.0008	1	0	171.53498	171.876778	-0.3417982	-0.1993
20000	33000	0.008	0.0008	1.1	0.3	82.39986	82.2150991	0.18476093	0.22422
1000	1000	0.0085	0.0008	1	0	166.32707	166.744967	-0.4178973	-0.2513
1000	1000	0.009	0.0008	1	0	161.55366	162.046981	-0.4933205	-0.3054
20000	33000	0.009	0.0008	1	0.3	93.85712	93.7908978	0.06622217	0.07056
1000	1000	0.0095	0.0008	1	0	157.15712	157.724949	-0.5678288	-0.3613
1000	1000	0.01	0.0008	1	0	153.09002	153.731264	-0.6412439	-0.4189

1000	1000	0.015	0.0008	1	0	124.222	125.521051	-1.2990514	-1.0457
1000	1000	0.02	0.0008	1	0	106.88317	108.704419	-1.8212492	-1.704
1000	1000	0.025	0.0008	1	0	94.98796	97.2281883	-2.2402283	-2.3584
1000	1000	0.03	0.0008	1	0	86.17086	88.7567866	-2.5859266	-3.0009
1000	1000	0.0005	0.0009	1	0	646.87406	648.187922	-1.3138622	-0.2031
1000	1000	0.0006	0.0009	1	0	590.82796	591.711911	-0.8839508	-0.1496
1000	1000	0.0007	0.0009	1	0	547.22015	547.81878	-0.5986303	-0.1094
1000	1000	0.0008	0.0009	1	0	512.04465	512.437547	-0.3928965	-0.0767
1000	1000	0.0009	0.0009	1	0	482.89441	483.130752	-0.236342	-0.0489
2000	1000	0.0009	0.0009	2	0.1	241.1468	240.357728	0.7890722	0.32722
2000	1000	0.0009	0.0009	4	0.2	59.80083	59.1835611	0.61726889	1.03221
2000	1000	0.0009	0.0009	7	0.3	19.21225	18.8322535	0.37999649	1.97789
2000	1000	0.0009	0.0009	10	0.4	9.09403	8.88961244	0.20441756	2.24782
1000	1000	0.001	0.0009	1	0	458.22531	458.338075	-0.1127652	-0.0246
2000	1000	0.001	0.0009	4	0.2	56.78703	56.146456	0.64057405	1.12803
2000	1000	0.001	0.0009	8	0.3	13.97469	13.6785371	0.2961529	2.11921
1000	1000	0.0015	0.0009	1	0	374.47873	374.231471	0.2472587	0.06603
1000	1000	0.002	0.0009	1	0	324.50305	324.093961	0.4090889	0.12607
20000	210000	0.002	0.0009	2	0.2	7.62278	7.56219805	0.06058195	0.79475
20000	210000	0.002	0.0009	5	0.3	1.20817	1.17908557	0.02908443	2.40731
1000	1000	0.0025	0.0009	1	0	290.36333	289.878451	0.4848788	0.16699
1000	1000	0.003	0.0009	1	0	265.13557	264.621611	0.5139589	0.19385
1000	1000	0.0035	0.0009	1	0	245.50655	244.992006	0.5145436	0.20958
1000	1000	0.004	0.0009	1	0	229.66556	229.169038	0.4965224	0.21619
20000	210000	0.004	0.0009	1	0.2	21.47526	21.3891261	0.08613392	0.40108
20000	210000	0.004	0.0009	2	0.3	5.27465	5.21087127	0.06377873	1.20916
1000	1000	0.0045	0.0009	1	0	216.52848	216.062641	0.4658393	0.21514
1000	1000	0.005	0.0009	1	0	205.40134	204.975019	0.4263214	0.20756
20000	210000	0.005	0.0009	2	0.3	4.72119	4.66074496	0.06044504	1.28029
1000	1000	0.0055	0.0009	1	0	195.81658	195.436012	0.3805681	0.19435
1000	1000	0.006	0.0009	1	0	187.44615	187.115736	0.3304143	0.17627
1000	1000	0.0065	0.0009	1	0	180.05217	179.774984	0.2771862	0.15395
1000	1000	0.007	0.0009	1	0	173.45738	173.235509	0.2218709	0.12791
20000	210000	0.007	0.0009	1.5	0.2	7.24179	7.1860709	0.0557191	0.76941
1000	1000	0.0075	0.0009	1	0	167.52662	167.361402	0.1652182	0.09862
1000	1000	0.008	0.0009	1	0	162.15477	162.046981	0.1077895	0.06647
20000	210000	0.008	0.0009	1.1	0.3	12.24483	12.1806361	0.06419392	0.52425
1000	1000	0.0085	0.0009	1	0	157.25868	157.208663	0.0500172	0.03181
1000	1000	0.009	0.0009	1	0	152.77161	152.779358	-0.0077484	-0.0051
1000	1000	0.0095	0.0009	1	0	148.63927	148.704508	-0.0652378	-0.0439
1000	1000	0.01	0.0009	1	0	144.81696	144.939226	-0.1222656	-0.0844

1000	1000	0.015	0.0009	1	0	117.69692	118.342382	-0.6454622	-0.5484
1000	1000	0.02	0.0009	1	0	101.41548	102.487509	-1.0720293	-1.0571
1000	1000	0.025	0.0009	1	0	90.24761	91.6676151	-1.4200051	-1.5735
1000	1000	0.03	0.0009	1	0	81.96966	83.6807009	-1.7110409	-2.0874
1000	1000	0.0005	0.001	1	0	613.71587	614.925056	-1.2091858	-0.197
1000	1000	0.0006	0.001	1	0	560.58078	561.347207	-0.766427	-0.1367
1000	1000	0.0007	0.001	1	0	519.22992	519.706527	-0.4766072	-0.0918
1000	1000	0.0008	0.001	1	0	485.8714	486.140942	-0.2695416	-0.0555
1000	1000	0.0009	0.001	1	0	458.22531	458.338075	-0.1127652	-0.0246
1000	1000	0.001	0.001	1	0	434.82847	434.817677	0.0107932	0.00248
3000	33000	0.001	0.001	2	0.1	9.87519	9.83281614	0.04237386	0.42909
3000	33000	0.001	0.001	4	0.2	2.45136	2.42114568	0.03021432	1.23255
3000	33000	0.001	0.001	7	0.3	0.78877	0.77041037	0.01835963	2.32763
3000	33000	0.001	0.001	10	0.4	0.37402	0.36366596	0.01035404	2.76831
1000	1000	0.0015	0.001	1	0	355.4018	355.027147	0.3746535	0.10542
1000	1000	0.002	0.001	1	0	308.00984	307.462528	0.5473121	0.17769
3000	33000	0.002	0.001	2	0.2	6.91004	6.84803412	0.06200588	0.89733
3000	33000	0.002	0.001	5	0.3	1.09671	1.0677343	0.0289757	2.64206
3000	33000	0.002	0.001	10	0.4	0.26953	0.25715067	0.01237933	4.59293
1000	1000	0.0025	0.001	1	0	275.64062	275.002845	0.6377749	0.23138
1000	1000	0.003	0.001	1	0	251.72541	251.042103	0.6833072	0.27145
1000	1000	0.0035	0.001	1	0	233.12089	232.419825	0.7010654	0.30073
1000	1000	0.004	0.001	1	0	218.10922	217.408838	0.7003816	0.32112
3000	33000	0.004	0.001	2	0.2	4.9053	4.84229136	0.06300864	1.2845
3000	33000	0.004	0.001	2.5	0.3	3.07589	3.02000866	0.05588134	1.81675
1000	1000	0.0045	0.001	1	0	205.66193	204.975019	0.6869114	0.334
1000	1000	0.005	0.001	1	0	195.1207	194.456377	0.6643234	0.34047
1000	1000	0.0055	0.001	1	0	186.04202	185.40688	0.6351396	0.3414
1000	1000	0.006	0.001	1	0	178.11469	177.513573	0.6011168	0.33749
3000	33000	0.006	0.001	2	0.2	4.01132	3.95371434	0.05760566	1.43608
3000	33000	0.006	0.001	2.25	0.3	3.10133	3.04423054	0.05709946	1.84113
1000	1000	0.0065	0.001	1	0	171.1131	170.549525	0.5635755	0.32936
1000	1000	0.007	0.001	1	0	164.86912	164.345634	0.5234859	0.31752
3000	33000	0.007	0.001	2	0.2	3.71483	3.66042821	0.05440179	1.46445
3000	33000	0.007	0.001	2.2	0.3	3.00354	2.94797515	0.05556485	1.84998
1000	1000	0.0075	0.001	1	0	159.25453	158.772967	0.4815633	0.30239
1000	1000	0.008	0.001	1	0	154.16967	153.731264	0.4384061	0.28437
3000	33000	0.008	0.001	1.2	0.3	9.34985	9.26852691	0.0813231	0.86978
1000	1000	0.0085	0.001	1	0	149.53566	149.141233	0.3944273	0.26377
1000	1000	0.009	0.001	1	0	145.28923	144.939226	0.3500044	0.2409
3000	33000	0.009	0.001	1.1	0.3	10.47918	10.3994788	0.07970116	0.76057

1000	1000	0.0095	0.001	1	0	141.37887	141.073483	0.3053871	0.21601
1000	1000	0.01	0.001	1	0	137.76223	137.501423	0.2608074	0.18932
3000	33000	0.01	0.001	1	0.3	12.01178	11.9376324	0.07414762	0.61729
1000	1000	0.015	0.001	1	0	112.11057	112.269441	-0.1588714	-0.1417
1000	1000	0.02	0.001	1	0	96.71781	97.2281883	-0.5103783	-0.5277
1000	1000	0.025	0.001	1	0	86.16198	86.9635354	-0.8015554	-0.9303
1000	1000	0.03	0.001	1	0	78.33843	79.3864833	-1.0480533	-1.3379
1000	1000	0.0005	0.0015	1	0	501.08118	502.084206	-1.0030255	-0.2002
1000	1000	0.0006	0.0015	1	0	457.86415	458.338075	-0.4739252	-0.1035
1000	1000	0.0007	0.0015	1	0	424.19442	424.338603	-0.1441826	-0.034
1000	1000	0.0008	0.0015	1	0	397.01416	396.932417	0.0817433	0.02059
1000	1000	0.0009	0.0015	1	0	374.47874	374.231471	0.2472687	0.06603
1000	1000	0.001	0.0015	1	0	355.4018	355.027147	0.3746535	0.10542
1000	1000	0.0015	0.0015	1	0	290.62166	289.878451	0.7432088	0.25573
50000	210000	0.0015	0.0015	2	0.1	17.32913	17.1684091	0.16072087	0.92746
50000	210000	0.0015	0.0015	4	0.2	4.32253	4.22739722	0.09513278	2.20086
50000	210000	0.0015	0.0015	5	0.25	2.75305	2.67447579	0.07857421	2.85408
50000	210000	0.0015	0.0015	6	0.3	1.89768	1.83091354	0.06676646	3.51832
50000	210000	0.0015	0.0015	7	0.35	1.37934	1.3222721	0.0570679	4.13733
1000	1000	0.002	0.0015	1	0	251.97252	251.042103	0.9304172	0.36925
1000	1000	0.0025	0.0015	1	0	225.58599	224.538883	1.0471072	0.46417
1000	1000	0.003	0.0015	1	0	206.10109	204.975019	1.1260714	0.54637
50000	210000	0.003	0.0015	1.5	0.2	21.51968	21.2566844	0.26299562	1.22212
50000	210000	0.003	0.0015	2	0.3	11.86699	11.6518624	0.21512761	1.81282
50000	210000	0.003	0.0015	2.5	0.4	7.35768	7.1838917	0.1737883	2.362
50000	210000	0.003	0.0015	3	0.45	5.01606	4.87358293	0.14247707	2.84042
1000	1000	0.0035	0.0015	1	0	190.95127	189.769992	1.1812778	0.61863
1000	1000	0.004	0.0015	1	0	178.73365	177.513573	1.2200768	0.68262
50000	210000	0.004	0.0015	1.5	0.1	18.93806	18.6905965	0.24746354	1.3067
50000	210000	0.004	0.0015	2	0.2	10.56398	10.3549661	0.20901387	1.97855
50000	210000	0.004	0.0015	2.25	0.3	8.17128	7.97298476	0.19829524	2.42673
1000	1000	0.0045	0.0015	1	0	168.60834	167.361402	1.2469382	0.73955
1000	1000	0.005	0.0015	1	0	160.0378	158.772967	1.2648333	0.79033
50000	210000	0.005	0.0015	1.5	0.1	16.96877	16.7173777	0.25139231	1.4815
50000	210000	0.005	0.0015	1.75	0.2	12.33656	12.0969969	0.23956308	1.9419
50000	210000	0.005	0.0015	2	0.3	9.24963	9.0254938	0.2241362	2.42319
1000	1000	0.0055	0.0015	1	0	152.65992	151.384084	1.2758361	0.83574
1000	1000	0.006	0.0015	1	0	146.22068	144.939226	1.2814544	0.87638
50000	210000	0.006	0.0015	1.4	0.2	17.54945	17.2546825	0.29476746	1.67964
50000	210000	0.006	0.0015	1.8	0.3	10.42005	10.1717419	0.24830813	2.38298
1000	1000	0.0065	0.0015	1	0	140.53593	139.253104	1.2828263	0.91281

1000	1000	0.007	0.0015	1	0	135.46846	134.187648	1.2808117	0.94547
50000	210000	0.007	0.0015	1.2	0.3	21.54652	21.1887069	0.35781309	1.66065
1000	1000	0.0075	0.0015	1	0	130.91366	129.637584	1.2760756	0.97475
1000	1000	0.008	0.0015	1	0	126.79019	125.521051	1.2691386	1.00098
50000	210000	0.008	0.0015	1.2	0.3	20.1765	19.8202204	0.35627957	1.76581
1000	1000	0.0085	0.0015	1	0	123.03374	121.773307	1.2604334	1.02446
1000	1000	0.009	0.0015	1	0	119.59267	118.342382	1.2502878	1.04546
50000	210000	0.009	0.0015	1.1	0.2	23.18015	22.820862	0.359288	1.54998
1000	1000	0.0095	0.0015	1	0	116.425	115.186017	1.2389835	1.06419
1000	1000	0.01	0.0015	1	0	113.49619	112.269441	1.2267486	1.08087
50000	210000	0.01	0.0015	1	0.2	26.57693	26.1962225	0.38070754	1.43247
1000	1000	0.015	0.0015	1	0	92.83013	91.6676151	1.16251495	1.2523
1000	1000	0.02	0.0015	1	0	80.42089	79.3864833	1.03440666	1.28624
1000	1000	0.025	0.0015	1	0	71.92467	71.0054293	0.91924071	1.27806
1000	1000	0.03	0.0015	1	0	65.63538	64.8187922	0.81658778	1.24413
1000	1000	0.0005	0.002	1	0	433.77708	434.817677	-1.0405968	-0.2399
1000	1000	0.0006	0.002	1	0	396.51893	396.932417	-0.4134867	-0.1043
1000	1000	0.0007	0.002	1	0	367.45724	367.48801	-0.0307696	-0.0084
1000	1000	0.0008	0.002	1	0	343.97911	343.753556	0.2255536	0.06557
1000	1000	0.0009	0.002	1	0	324.50306	324.093961	0.4090989	0.12607
1000	1000	0.001	0.002	1	0	308.00985	307.462528	0.5473221	0.1777
1000	1000	0.0015	0.002	1	0	251.97252	251.042103	0.9304172	0.36925
1000	1000	0.002	0.002	1	0	218.52794	217.408838	1.1191016	0.51211
22222	777777	0.002	0.002	1	0.1	6.21805	6.18057166	0.03747834	0.60273
22222	777777	0.002	0.002	2	0.2	1.54639	1.5218493	0.0245407	1.58697
22222	777777	0.002	0.002	3	0.3	0.67676	0.65912294	0.01763706	2.6061
22222	777777	0.002	0.002	4	0.4	0.3706	0.35716871	0.01343129	3.6242
22222	777777	0.002	0.002	5	0.49	0.22905	0.21740704	0.01164296	5.08315
1000	1000	0.0025	0.002	1	0	195.69605	194.456377	1.2396734	0.63347
1000	1000	0.003	0.002	1	0	178.83952	177.513573	1.3259468	0.74142
22222	777777	0.003	0.002	2	0.1	1.28572	1.26160391	0.02411609	1.87569
22222	777777	0.003	0.002	2.5	0.2	0.81638	0.79525424	0.02112576	2.58774
22222	777777	0.003	0.002	3	0.3	0.55677	0.53817163	0.01859837	3.3404
22222	777777	0.003	0.002	3.2	0.4	0.47339	0.45566724	0.01772276	3.7438
1000	1000	0.0035	0.002	1	0	165.73668	164.345634	1.3910459	0.83931
1000	1000	0.004	0.002	1	0	155.17276	153.731264	1.4414961	0.92896
1000	1000	0.0045	0.002	1	0	146.42033	144.939226	1.4811044	1.01154
22222	777777	0.0045	0.002	1.5	0.1	1.86484	1.83128049	0.03355951	1.79959
22222	777777	0.0045	0.002	1.75	0.2	1.35659	1.32514769	0.03144231	2.31775
22222	777777	0.0045	0.002	2	0.3	1.01784	0.98868441	0.02915559	2.86446
1000	1000	0.005	0.002	1	0	139.01382	137.501423	1.5123974	1.08795

1000	1000	0.0055	0.002	1	0	132.63961	131.102462	1.5371476	1.15889
1000	1000	0.006	0.002	1	0	127.0777	125.521051	1.5566486	1.22496
1000	1000	0.0065	0.002	1	0	122.16863	120.596725	1.5719047	1.28667
1000	1000	0.007	0.002	1	0	117.7936	116.209912	1.5836877	1.34446
22222	777777	0.007	0.002	1.2	0.3	2.25134	2.2019752	0.0493648	2.19269
22222	777777	0.007	0.002	1.25	0.2	2.12753	2.08246443	0.04506557	2.11821
22222	777777	0.007	0.002	1.3	0.1	1.99485	1.95482516	0.04002484	2.00641
1000	1000	0.0075	0.002	1	0	113.86204	112.269441	1.5925986	1.39871
1000	1000	0.008	0.002	1	0	110.30354	108.704419	1.5991208	1.44975
22222	777777	0.008	0.002	1.1	0.2	2.56685	2.51545339	0.05139661	2.00232
22222	777777	0.008	0.002	1.2	0.3	2.10948	2.05975919	0.04972081	2.35702
1000	1000	0.0085	0.002	1	0	107.06243	105.458777	1.603653	1.49787
1000	1000	0.009	0.002	1	0	104.09401	102.487509	1.6065007	1.54332
22222	777777	0.009	0.002	1.1	0.3	2.36552	2.3110924	0.0544276	2.30087
1000	1000	0.0095	0.002	1	0	101.36193	99.7540164	1.60791357	1.58631
1000	1000	0.01	0.002	1	0	98.83632	97.2281883	1.60813168	1.62707
22222	777777	0.01	0.002	1	0.3	2.247	2.19249476	0.05450524	2.42569
1000	1000	0.015	0.002	1	0	80.95914	79.3864833	1.57265666	1.94253
1000	1000	0.02	0.002	1	0	70.26295	68.7507113	1.51223871	2.15226
1000	1000	0.025	0.002	1	0	62.9419	61.4925056	1.44939442	2.30275
1000	1000	0.03	0.002	1	0	57.5237	56.1347207	1.3889793	2.41462
1000	1000	0.0005	0.0025	1	0	387.73759	388.912753	-1.1751633	-0.3031
1000	1000	0.0006	0.0025	1	0	354.57669	355.027147	-0.4504565	-0.127
1000	1000	0.0007	0.0025	1	0	328.67958	328.691268	-0.0116882	-0.0036
1000	1000	0.0008	0.0025	1	0	307.74166	307.462528	0.2791321	0.0907
1000	1000	0.0009	0.0025	1	0	290.36333	289.878451	0.4848788	0.16699
1000	1000	0.001	0.0025	1	0	275.64063	275.002845	0.6377849	0.23138
1000	1000	0.0015	0.0025	1	0	225.58599	224.538883	1.0471072	0.46417
1000	1000	0.002	0.0025	1	0	195.69605	194.456377	1.2396734	0.63347
1000	1000	0.0025	0.0025	1	0	175.28882	173.927071	1.3617493	0.77686
10000	33000	0.0025	0.0025	1.5	0.1	23.64664	23.307416	0.33922397	1.43455
10000	33000	0.0025	0.0025	2	0.2	13.19522	12.912777	0.28244303	2.1405
10000	33000	0.0025	0.0025	2.5	0.3	8.29345	8.05335641	0.24009359	2.89498
10000	33000	0.0025	0.0025	3	0.4	5.59022	5.38764391	0.2025761	3.62376
10000	33000	0.0025	0.0025	3	0.49	5.34454	5.12411785	0.22042215	4.12425
1000	1000	0.003	0.0025	1	0	160.22341	158.772967	1.4504433	0.90526
10000	33000	0.003	0.0025	1.5	0.1	21.62926	21.2766625	0.35259748	1.63019
10000	33000	0.003	0.0025	2	0.2	12.07848	11.7876987	0.29078129	2.40743
10000	33000	0.003	0.0025	3	0.3	5.30938	5.10532983	0.20405017	3.8432
1000	1000	0.0035	0.0025	1	0	148.51449	146.995204	1.5192862	1.02299
1000	1000	0.004	0.0025	1	0	139.07598	137.501423	1.5745574	1.13216

1000	1000	0.0045	0.0025	1	0	131.25736	129.637584	1.6197756	1.23405
1000	1000	0.005	0.0025	1	0	124.6422	122.985011	1.6571888	1.32956
10000	33000	0.005	0.0025	1.5	0.2	16.64774	16.2323772	0.41536283	2.49501
10000	33000	0.005	0.0025	2	0.3	9.2259	8.89778583	0.32811417	3.55645
1000	1000	0.0055	0.0025	1	0	118.94998	117.261607	1.6883728	1.4194
1000	1000	0.006	0.0025	1	0	113.98395	112.269441	1.7145086	1.50417
10000	33000	0.006	0.0025	1.25	0.2	21.84458	21.3380139	0.50656607	2.31896
10000	33000	0.006	0.0025	1.5	0.3	14.88697	14.4400534	0.44691664	3.00207
1000	1000	0.0065	0.0025	1	0	109.60147	107.86499	1.7364797	1.58436
1000	1000	0.007	0.0025	1	0	105.69631	103.941305	1.7550046	1.66042
1000	1000	0.0075	0.0025	1	0	102.18747	100.416841	1.7706289	1.73273
1000	1000	0.008	0.0025	1	0	99.01201	97.2281883	1.78382168	1.80162
10000	33000	0.008	0.0025	1	0.2	29.5192	28.8738471	0.64535292	2.18621
10000	33000	0.008	0.0025	1	0.3	28.81557	28.1372694	0.67830065	2.35394
1000	1000	0.0085	0.0025	1	0	96.12014	94.3251977	1.79494229	1.86739
1000	1000	0.009	0.0025	1	0	93.4719	91.6676151	1.80428495	1.9303
1000	1000	0.0095	0.0025	1	0	91.03481	89.2227047	1.81210529	1.99056
1000	1000	0.01	0.0025	1	0	88.78215	86.9635354	1.81861463	2.0484
10000	33000	0.01	0.0025	1	0.4	24.93095	24.2443976	0.68655243	2.75382
1000	1000	0.015	0.0025	1	0	72.84488	71.0054293	1.83945071	2.52516
1000	1000	0.02	0.0025	1	0	63.31648	61.4925056	1.82397442	2.88073
1000	1000	0.025	0.0025	1	0	56.79802	55.000569	1.79745097	3.16464
1000	1000	0.03	0.0025	1	0	51.97587	50.2084206	1.76744945	3.40052
1000	1000	0.0005	0.003	1	0	353.67151	355.027147	-1.3556365	-0.3833
1000	1000	0.0006	0.003	1	0	323.55725	324.093961	-0.5367111	-0.1659
1000	1000	0.0007	0.003	1	0	300.01064	300.052703	-0.0420634	-0.014
1000	1000	0.0008	0.003	1	0	280.95799	280.673604	0.2843865	0.10122
1000	1000	0.0009	0.003	1	0	265.13558	264.621611	0.5139689	0.19385
1000	1000	0.001	0.003	1	0	251.72542	251.042103	0.6833172	0.27145
1000	1000	0.0015	0.003	1	0	206.10109	204.975019	1.1260714	0.54637
1000	1000	0.002	0.003	1	0	178.83952	177.513573	1.3259468	0.74142
1000	1000	0.0025	0.003	1	0	160.22341	158.772967	1.4504433	0.90526
1000	1000	0.003	0.003	1	0	146.48028	144.939226	1.5410544	1.05206
1000	1000	0.0035	0.003	1	0	135.79992	134.187648	1.6122717	1.18724
1000	1000	0.004	0.003	1	0	127.19156	125.521051	1.6705086	1.31338
1000	1000	0.0045	0.003	1	0	120.06156	118.342382	1.7191778	1.43191
1000	1000	0.005	0.003	1	0	114.02985	112.269441	1.7604086	1.54381
1000	1000	0.0055	0.003	1	0	108.84035	107.044712	1.7956377	1.64979
1000	1000	0.006	0.003	1	0	104.31345	102.487509	1.8259407	1.75044
1000	1000	0.0065	0.003	1	0	100.31897	98.4668139	1.85215609	1.84627
1000	1000	0.007	0.003	1	0	96.75992	94.8849961	1.87492392	1.93771

1000	1000	0.0075	0.003	1	0	93.56241	91.6676151	1.89479495	2.02517
1000	1000	0.008	0.003	1	0	90.66896	88.7567866	1.91217338	2.10896
1000	1000	0.0085	0.003	1	0	88.03416	86.1067309	1.92742913	2.18941
1000	1000	0.009	0.003	1	0	85.62156	83.6807009	1.94085908	2.26679
1000	1000	0.0095	0.003	1	0	83.4015	81.4488134	1.95268665	2.34131
1000	1000	0.01	0.003	1	0	81.34962	79.3864833	1.96313666	2.41321
1000	1000	0.015	0.003	1	0	66.83822	64.8187922	2.01942778	3.02137
1000	1000	0.02	0.003	1	0	58.16728	56.1347207	2.0325593	3.49433
1000	1000	0.025	0.003	1	0	52.2377	50.2084206	2.02927945	3.8847
1000	1000	0.03	0.003	1	0	47.85253	45.8338075	2.01872248	4.21863
1000	1000	0.0005	0.0035	1	0	327.13181	328.691268	-1.5594582	-0.4767
1000	1000	0.0006	0.0035	1	0	299.40228	300.052703	-0.6504234	-0.2172
1000	1000	0.0007	0.0035	1	0	277.69357	277.794824	-0.1012538	-0.0365
1000	1000	0.0008	0.0035	1	0	260.11396	259.853264	0.2606964	0.10022
1000	1000	0.0009	0.0035	1	0	245.50656	244.992006	0.5145536	0.20959
1000	1000	0.001	0.0035	1	0	233.1209	232.419825	0.7010754	0.30073
1000	1000	0.0015	0.0035	1	0	190.95127	189.769992	1.1812778	0.61863
1000	1000	0.002	0.0035	1	0	165.73668	164.345634	1.3910459	0.83931
1000	1000	0.0025	0.0035	1	0	148.51449	146.995204	1.5192862	1.02299
1000	1000	0.003	0.0035	1	0	135.79992	134.187648	1.6122717	1.18724
1000	1000	0.0035	0.0035	1	0	125.91936	124.233622	1.685738	1.33874
50000	210000	0.0035	0.0035	1.5	0.1	13.3867	13.0806927	0.30600734	2.28591
50000	210000	0.0035	0.0035	2	0.2	7.49394	7.24696667	0.24697333	3.29564
50000	210000	0.0035	0.0035	2.5	0.25	4.78708	4.58481565	0.20226435	4.22521
50000	210000	0.0035	0.0035	3	0.3	3.30965	3.13870892	0.17094108	5.16493
50000	210000	0.0035	0.0035	3	0.35	3.25955	3.08530157	0.17424843	5.34578
50000	210000	0.0035	0.0035	3	0.4	3.19963	3.0236777	0.1759523	5.49915
1000	1000	0.004	0.0035	1	0	117.95638	116.209912	1.7464677	1.4806
1000	1000	0.0045	0.0035	1	0	111.36168	109.563756	1.7979239	1.61449
1000	1000	0.005	0.0035	1	0	105.78347	103.941305	1.8421646	1.74145
1000	1000	0.0055	0.0035	1	0	100.9847	99.1041462	1.88055378	1.86222
1000	1000	0.006	0.0035	1	0	96.7991	94.8849961	1.91410392	1.9774
1000	1000	0.0065	0.0035	1	0	93.10615	91.1625555	1.94359453	2.0875
1000	1000	0.007	0.0035	1	0	89.81607	87.8464365	1.96963346	2.19296
1000	1000	0.0075	0.0035	1	0	86.86044	84.8677205	1.99271949	2.29416
1000	1000	0.008	0.0035	1	0	84.1861	82.172817	2.01328296	2.39147
1000	1000	0.0085	0.0035	1	0	81.751	79.7193422	2.03165783	2.48518
1000	1000	0.009	0.0035	1	0	79.5214	77.4732749	2.04812512	2.57556
1000	1000	0.0095	0.0035	1	0	77.46989	75.4069485	2.0629415	2.66289
1000	1000	0.01	0.0035	1	0	75.57391	73.4976019	2.07630808	2.74739
1000	1000	0.015	0.0035	1	0	62.16894	60.0105407	2.15839932	3.47183

1000	1000	0.02	0.0035	1	0	54.16293	51.9706527	2.19227728	4.04756
1000	1000	0.025	0.0035	1	0	48.68981	46.4839649	2.20584507	4.5304
1000	1000	0.03	0.0035	1	0	44.6432	42.4338603	2.20933974	4.94888
1000	1000	0.0005	0.004	1	0	305.68749	307.462528	-1.7750379	-0.5807
1000	1000	0.0006	0.004	1	0	279.89345	280.673604	-0.7801535	-0.2787
1000	1000	0.0007	0.004	1	0	259.67502	259.853264	-0.1782436	-0.0686
1000	1000	0.0008	0.004	1	0	243.289	243.070471	0.2185292	0.08982
1000	1000	0.0009	0.004	1	0	229.66557	229.169038	0.4965324	0.2162
1000	1000	0.001	0.004	1	0	218.10923	217.408838	0.7003916	0.32112
1000	1000	0.0015	0.004	1	0	178.73365	177.513573	1.2200768	0.68262
1000	1000	0.002	0.004	1	0	155.17276	153.731264	1.4414961	0.92896
1000	1000	0.0025	0.004	1	0	139.07598	137.501423	1.5745574	1.13216
1000	1000	0.003	0.004	1	0	127.19156	125.521051	1.6705086	1.31338
1000	1000	0.0035	0.004	1	0	117.95638	116.209912	1.7464677	1.4806
1000	1000	0.004	0.004	1	0	110.51406	108.704419	1.8096408	1.63748
50000	210000	0.004	0.004	1.5	0.1	11.76751	11.4456061	0.32190392	2.73553
50000	210000	0.004	0.004	1.75	0.2	8.57773	8.28224762	0.29548238	3.44476
50000	210000	0.004	0.004	2	0.3	6.45095	6.17933318	0.27161682	4.21049
50000	210000	0.004	0.004	2.25	0.4	4.94968	4.70349865	0.24618135	4.97368
50000	210000	0.004	0.004	2.5	0.49	3.86063	3.6439819	0.2166481	5.61173
50000	210000	0.004	0.004	2.5	0.1	4.3107	4.12041819	0.19028181	4.41417
1000	1000	0.0045	0.004	1	0	104.35118	102.487509	1.8636707	1.78596
1000	1000	0.005	0.004	1	0	99.13882	97.2281883	1.91063168	1.92723
1000	1000	0.0055	0.004	1	0	94.65529	92.7034402	1.95184981	2.06206
1000	1000	0.006	0.004	1	0	90.74506	88.7567866	1.98827338	2.19105
50000	210000	0.006	0.004	1.2	0.3	14.50162	14.0150123	0.48660773	3.35554
50000	210000	0.006	0.004	1.5	0.4	9.03562	8.64087877	0.39474123	4.36872
1000	1000	0.0065	0.004	1	0	87.29539	85.2747623	2.02062773	2.3147
1000	1000	0.007	0.004	1	0	84.22233	82.172817	2.04951296	2.43346
1000	1000	0.0075	0.004	1	0	81.46188	79.3864833	2.07539666	2.54769
1000	1000	0.008	0.004	1	0	78.96432	76.865632	2.09868803	2.65777
50000	210000	0.008	0.004	1.2	0.1	13.09793	12.6457276	0.45220238	3.45247
50000	210000	0.008	0.004	1.25	0.2	11.94193	11.4786096	0.46332043	3.87978
1000	1000	0.0085	0.004	1	0	76.69034	74.5706164	2.11972363	2.764
1000	1000	0.009	0.004	1	0	74.60839	72.4696128	2.13877719	2.86667
50000	210000	0.009	0.004	1.1	0.4	13.68997	13.1192628	0.57070725	4.1688
1000	1000	0.0095	0.004	1	0	72.69284	70.5367415	2.15609853	2.96604
1000	1000	0.01	0.004	1	0	70.9226	68.7507113	2.17188871	3.06234
50000	210000	0.01	0.004	1	0.35	15.99999	15.3666139	0.63337615	3.9586
1000	1000	0.015	0.004	1	0	58.4096	56.1347207	2.2748793	3.8947
1000	1000	0.02	0.004	1	0	50.9393	48.6140942	2.32520584	4.56466

1000	1000	0.025	0.004	1	0	45.83384	43.4817677	2.35207232	5.13174
1000	1000	0.03	0.004	1	0	42.05983	39.6932417	2.36658833	5.62672
1000	1000	0.0005	0.0045	1	0	287.88269	289.878451	-1.9957612	-0.6933
1000	1000	0.0006	0.0045	1	0	263.70238	264.621611	-0.9192311	-0.3486
1000	1000	0.0007	0.0045	1	0	244.72546	244.992006	-0.2665464	-0.1089
1000	1000	0.0008	0.0045	1	0	229.33314	229.169038	0.1641024	0.07156
1000	1000	0.0009	0.0045	1	0	216.52849	216.062641	0.4658493	0.21514
1000	1000	0.001	0.0045	1	0	205.66194	204.975019	0.6869214	0.33401
1000	1000	0.0015	0.0045	1	0	168.60835	167.361402	1.2469482	0.73955
1000	1000	0.002	0.0045	1	0	146.42034	144.939226	1.4811144	1.01155
1000	1000	0.0025	0.0045	1	0	131.25736	129.637584	1.6197756	1.23405
1000	1000	0.003	0.0045	1	0	120.06157	118.342382	1.7191878	1.43192
1000	1000	0.0035	0.0045	1	0	111.36168	109.563756	1.7979239	1.61449
1000	1000	0.004	0.0045	1	0	104.35118	102.487509	1.8636707	1.78596
1000	1000	0.0045	0.0045	1	0	98.54639	96.6261504	1.92023959	1.94856
1000	1000	0.005	0.0045	1	0	93.63741	91.6676151	1.96979495	2.10364
1000	1000	0.0055	0.0045	1	0	89.41532	87.4016416	2.01367841	2.25205
1000	1000	0.006	0.0045	1	0	85.7335	83.6807009	2.05279908	2.3944
1000	1000	0.0065	0.0045	1	0	82.48567	80.3978169	2.08785311	2.53117
1000	1000	0.007	0.0045	1	0	79.59268	77.4732749	2.11940512	2.66281
1000	1000	0.0075	0.0045	1	0	76.99419	74.8462943	2.14789573	2.78969
1000	1000	0.008	0.0045	1	0	74.64333	72.4696128	2.17371719	2.91214
1000	1000	0.0085	0.0045	1	0	72.50306	70.3058514	2.19720865	3.0305
1000	1000	0.009	0.0045	1	0	70.54363	68.3250062	2.21862381	3.14504
1000	1000	0.0095	0.0045	1	0	68.74091	66.5026776	2.23823238	3.25604
1000	1000	0.01	0.0045	1	0	67.07502	64.8187922	2.25622778	3.36374
1000	1000	0.015	0.0045	1	0	55.30182	52.9243222	2.37749778	4.29913
1000	1000	0.02	0.0045	1	0	48.27554	45.8338075	2.44173248	5.05791
1000	1000	0.025	0.0045	1	0	43.47473	40.9950037	2.47972628	5.70383
1000	1000	0.03	0.0045	1	0	39.92656	37.4231471	2.50341287	6.27004
1000	1000	0.0005	0.005	1	0	272.78526	275.002845	-2.2175851	-0.8129
1000	1000	0.0006	0.005	1	0	249.9786	251.042103	-1.0635028	-0.4254
1000	1000	0.0007	0.005	1	0	232.05777	232.419825	-0.3620546	-0.156
1000	1000	0.0008	0.005	1	0	217.51025	217.408838	0.1014116	0.04662
1000	1000	0.0009	0.005	1	0	205.40135	204.975019	0.4263314	0.20756
1000	1000	0.001	0.005	1	0	195.12071	194.456377	0.6643334	0.34047
1000	1000	0.0015	0.005	1	0	160.03781	158.772967	1.2648433	0.79034
1000	1000	0.002	0.005	1	0	139.01383	137.501423	1.5124074	1.08795
1000	1000	0.0025	0.005	1	0	124.6422	122.985011	1.6571888	1.32956
1000	1000	0.003	0.005	1	0	114.02985	112.269441	1.7604086	1.54381
1000	1000	0.0035	0.005	1	0	105.78347	103.941305	1.8421646	1.74145

1000	1000	0.004	0.005	1	0	99.13882	97.2281883	1.91063168	1.92723
1000	1000	0.0045	0.005	1	0	93.63741	91.6676151	1.96979495	2.10364
1000	1000	0.005	0.005	1	0	88.98543	86.9635354	2.02189463	2.27216
50000	210000	0.005	0.005	1.1	0.1	17.50733	17.0265215	0.48080855	2.74633
50000	210000	0.005	0.005	1.3	0.2	12.44087	12.0068087	0.43406132	3.48899
50000	210000	0.005	0.005	1.5	0.3	9.18192	8.78838497	0.39353503	4.28598
50000	210000	0.005	0.005	1.7	0.4	6.94421	6.59140814	0.35280186	5.08052
50000	210000	0.005	0.005	2	0.1	5.40985	5.15052274	0.25932726	4.79361
1000	1000	0.0055	0.005	1	0	84.98482	82.9164776	2.0683424	2.43378
1000	1000	0.006	0.005	1	0	81.49655	79.3864833	2.11006666	2.58915
50000	210000	0.006	0.005	1.2	0.2	13.34927	12.8635601	0.4857099	3.63848
50000	210000	0.006	0.005	1.5	0.3	8.42844	8.02266116	0.40577884	4.8144
1000	1000	0.0065	0.005	1	0	78.41979	76.2720661	2.14772392	2.73875
1000	1000	0.007	0.005	1	0	75.67944	73.4976019	2.18183808	2.883
50000	210000	0.007	0.005	1.2	0.3	12.12865	11.6055327	0.52311726	4.31307
50000	210000	0.007	0.005	1.5	0.4	7.5801	7.15532741	0.42477259	5.60379
1000	1000	0.0075	0.005	1	0	73.21828	71.0054293	2.21285071	3.02227
1000	1000	0.008	0.005	1	0	70.99183	68.7507113	2.24111871	3.15687
50000	210000	0.008	0.005	1.1	0.4	13.04031	12.4460255	0.59428454	4.55729
50000	210000	0.008	0.005	1.2	0.3	11.39013	10.8559818	0.53414818	4.68957
1000	1000	0.0085	0.005	1	0	68.96496	66.6979869	2.26697307	3.28714
1000	1000	0.009	0.005	1	0	67.10947	64.8187922	2.29067778	3.41335
1000	1000	0.0095	0.005	1	0	65.40245	63.0899795	2.31247046	3.53576
1000	1000	0.01	0.005	1	0	63.82507	61.4925056	2.33256442	3.65462
50000	210000	0.01	0.005	1	0.4	14.14393	13.469797	0.67413305	4.76624
50000	210000	0.01	0.005	1	0.3	14.6473	13.9822349	0.66506513	4.54053
1000	1000	0.015	0.005	1	0	52.67918	50.2084206	2.47075945	4.6902
1000	1000	0.02	0.005	1	0	46.02909	43.4817677	2.54732232	5.53416
1000	1000	0.025	0.005	1	0	41.48632	38.8912753	2.59504467	6.25518
1000	1000	0.03	0.005	1	0	38.12938	35.5027147	2.62666535	6.88882
1000	1000	0.0005	0.0055	1	0	259.76702	262.204925	-2.4379048	-0.9385
1000	1000	0.0006	0.0055	1	0	238.14904	239.359253	-1.2102133	-0.5082
1000	1000	0.0007	0.0055	1	0	221.14158	221.603608	-0.4620278	-0.2089
1000	1000	0.0008	0.0055	1	0	207.32432	207.291194	0.033126	0.01598
1000	1000	0.0009	0.0055	1	0	195.8166	195.436012	0.3805881	0.19436
1000	1000	0.001	0.0055	1	0	186.04203	185.40688	0.6351496	0.3414
1000	1000	0.0015	0.0055	1	0	152.65993	151.384084	1.2758461	0.83574
1000	1000	0.002	0.0055	1	0	132.63961	131.102462	1.5371476	1.15889
1000	1000	0.0025	0.0055	1	0	118.94998	117.261607	1.6883728	1.4194
1000	1000	0.003	0.0055	1	0	108.84035	107.044712	1.7956377	1.64979
1000	1000	0.0035	0.0055	1	0	100.9847	99.1041462	1.88055378	1.86222

1000	1000	0.004	0.0055	1	0	94.65529	92.7034402	1.95184981	2.06206
1000	1000	0.0045	0.0055	1	0	89.41532	87.4016416	2.01367841	2.25205
1000	1000	0.005	0.0055	1	0	84.98482	82.9164776	2.0683424	2.43378
1000	1000	0.0055	0.0055	1	0	81.17506	79.0577594	2.11730057	2.60831
1000	1000	0.006	0.0055	1	0	77.85358	75.692042	2.16153805	2.77641
1000	1000	0.0065	0.0055	1	0	74.92428	72.7225616	2.20171839	2.93859
1000	1000	0.007	0.0055	1	0	72.31556	70.0772138	2.23834617	3.09525
1000	1000	0.0075	0.0055	1	0	69.97284	67.7010205	2.27181953	3.24672
1000	1000	0.008	0.0055	1	0	67.85372	65.5512312	2.3024888	3.39331
1000	1000	0.0085	0.0055	1	0	65.92471	63.5940353	2.33067468	3.53536
1000	1000	0.009	0.0055	1	0	64.15892	61.8022935	2.35662654	3.67311
1000	1000	0.0095	0.0055	1	0	62.53451	60.1539352	2.38057476	3.80682
1000	1000	0.01	0.0055	1	0	61.03354	58.6308036	2.40273642	3.93675
1000	1000	0.015	0.0055	1	0	50.42906	47.8718507	2.55720934	5.0709
1000	1000	0.02	0.0055	1	0	44.10336	41.4582388	2.6451212	5.99755
1000	1000	0.025	0.0055	1	0	39.783	37.0813761	2.70162393	6.7909
1000	1000	0.03	0.0055	1	0	36.59085	33.8505102	2.74033977	7.48914
1000	1000	0.0005	0.006	1	0	248.3871	251.042103	-2.6550028	-1.0689
1000	1000	0.0006	0.006	1	0	227.81153	229.169038	-1.3575076	-0.5959
1000	1000	0.0007	0.006	1	0	211.60472	212.169301	-0.5645813	-0.2668
1000	1000	0.0008	0.006	1	0	198.42734	198.466208	-0.0388683	-0.0196
1000	1000	0.0009	0.006	1	0	187.44617	187.115736	0.3304343	0.17628
1000	1000	0.001	0.006	1	0	178.11471	177.513573	0.6011368	0.3375
1000	1000	0.0015	0.006	1	0	146.22069	144.939226	1.2814644	0.87639
1000	1000	0.002	0.006	1	0	127.07771	125.521051	1.5566586	1.22497
1000	1000	0.0025	0.006	1	0	113.98395	112.269441	1.7145086	1.50417
1000	1000	0.003	0.006	1	0	104.31345	102.487509	1.8259407	1.75044
1000	1000	0.0035	0.006	1	0	96.7991	94.8849961	1.91410392	1.9774
1000	1000	0.004	0.006	1	0	90.74506	88.7567866	1.98827338	2.19105
1000	1000	0.0045	0.006	1	0	85.7335	83.6807009	2.05279908	2.3944
1000	1000	0.005	0.006	1	0	81.49655	79.3864833	2.11006666	2.58915
1000	1000	0.0055	0.006	1	0	77.85358	75.692042	2.16153805	2.77641
1000	1000	0.006	0.006	1	0	74.67783	72.4696128	2.20821719	2.95699
3000	1000	0.006	0.006	1.1	0.1	185.32617	178.778475	6.5476948	3.53307
3000	1000	0.006	0.006	1.2	0.2	154.30727	147.958903	6.3483672	4.11411
3000	1000	0.006	0.006	1.3	0.3	128.99763	122.855382	6.1422483	4.76152
3000	1000	0.006	0.006	1.4	0.4	107.8332	102.049122	5.7840776	5.36391
3000	1000	0.006	0.006	1.5	0.49	90.30454	85.0262442	5.27829577	5.84499
3000	1000	0.006	0.006	1.5	0	101.07098	96.6262222	4.44475779	4.39766
1000	1000	0.006	0.006	1.5	0	33.69033	32.2087407	1.48158926	4.39767
1000	1000	0.0065	0.006	1	0	71.87739	69.6265518	2.25083817	3.1315

1000	1000	0.007	0.006	1	0	69.38372	67.0938242	2.28989584	3.30034
3000	1000	0.007	0.006	1	0.3	200.48125	192.223949	8.2573009	4.11874
3000	1000	0.007	0.006	1.3	0.4	116.01471	109.573427	6.4412826	5.55213
1000	1000	0.0075	0.006	1	0	67.14458	64.8187922	2.32578778	3.46385
1000	1000	0.008	0.006	1	0	65.11936	62.7605257	2.35883431	3.62232
3000	1000	0.008	0.006	1	0.2	192.6093	184.516083	8.0932173	4.20188
3000	1000	0.008	0.006	1.3	0.3	112.86181	106.395882	6.4659285	5.72907
1000	1000	0.0085	0.006	1	0	63.27598	60.8866533	2.38932669	3.77604
1000	1000	0.009	0.006	1	0	61.5887	59.1711911	2.41750892	3.92525
3000	1000	0.009	0.006	1	0.2	182.22827	173.963431	8.2648389	4.53543
1000	1000	0.0095	0.006	1	0	60.03662	57.5930082	2.44361176	4.0702
1000	1000	0.01	0.006	1	0	58.60255	56.1347207	2.4678293	4.21113
3000	1000	0.01	0.006	1	0.3	169.61574	160.826094	8.7896457	5.18209
1000	1000	0.015	0.006	1	0	48.47221	45.8338075	2.63840248	5.44312
1000	1000	0.02	0.006	1	0	42.4303	39.6932417	2.73705833	6.45072
1000	1000	0.025	0.006	1	0	38.30439	35.5027147	2.80167535	7.31424
1000	1000	0.03	0.006	1	0	35.25628	32.4093961	2.84688389	8.07483
1000	1000	0.0005	0.0065	1	0	238.32571	241.193451	-2.8677407	-1.2033
1000	1000	0.0006	0.0065	1	0	218.67441	220.178489	-1.5040794	-0.6878
1000	1000	0.0007	0.0065	1	0	203.17732	203.845671	-0.668351	-0.3289
1000	1000	0.0008	0.0065	1	0	190.56694	190.680165	-0.1132252	-0.0594
1000	1000	0.0009	0.0065	1	0	180.05219	179.774984	0.2772062	0.15396
1000	1000	0.001	0.0065	1	0	171.11312	170.549525	0.5635955	0.32937
1000	1000	0.0015	0.0065	1	0	140.53594	139.253104	1.2828363	0.91282
1000	1000	0.002	0.0065	1	0	122.16864	120.596725	1.5719147	1.28668
1000	1000	0.0025	0.0065	1	0	109.60148	107.86499	1.7364897	1.58437
1000	1000	0.003	0.0065	1	0	100.31897	98.4668139	1.85215609	1.84627
1000	1000	0.0035	0.0065	1	0	93.10615	91.1625555	1.94359453	2.0875
1000	1000	0.004	0.0065	1	0	87.29539	85.2747623	2.02062773	2.3147
1000	1000	0.0045	0.0065	1	0	82.48567	80.3978169	2.08785311	2.53117
1000	1000	0.005	0.0065	1	0	78.41979	76.2720661	2.14772392	2.73875
1000	1000	0.0055	0.0065	1	0	74.92428	72.7225616	2.20171839	2.93859
1000	1000	0.006	0.0065	1	0	71.87739	69.6265518	2.25083817	3.1315
1000	1000	0.0065	0.0065	1	0	69.19086	66.8950272	2.29583279	3.31812
3000	1000	0.0065	0.0065	1.1	0.1	171.80604	165.026285	6.7797552	3.94617
3000	1000	0.0065	0.0065	1.2	0.2	143.13098	136.577449	6.5535313	4.5787
3000	1000	0.0065	0.0065	1.3	0.3	119.7358	113.404968	6.3308323	5.28733
3000	1000	0.0065	0.0065	1.4	0.4	100.17021	94.1991899	5.97102007	5.96087
1000	1000	0.007	0.0065	1	0	66.79891	64.4616612	2.33724883	3.49893
1000	1000	0.0075	0.0065	1	0	64.65137	62.2758812	2.37548882	3.67431
1000	1000	0.008	0.0065	1	0	62.70922	60.2983627	2.41085733	3.8445

1000	1000	0.0085	0.0065	1	0	60.94163	58.4980043	2.44362569	4.00978
1000	1000	0.009	0.0065	1	0	59.32387	56.8498415	2.47402849	4.17038
1000	1000	0.0095	0.0065	1	0	57.83585	55.3335725	2.50227751	4.32652
1000	1000	0.01	0.0065	1	0	56.46107	53.9324951	2.52857486	4.47844
3000	1000	0.01	0.0065	1	0.4	157.98321	148.853797	9.1294128	5.77872
1000	1000	0.015	0.0065	1	0	46.76309	44.0356979	2.72739212	5.83236
1000	1000	0.02	0.0065	1	0	40.97667	38.136033	2.84063696	6.93233
1000	1000	0.025	0.0065	1	0	37.02795	34.1099049	2.91804509	7.88066
1000	1000	0.03	0.0065	1	0	34.11271	31.1379406	2.97476941	8.72041
1000	1000	0.0005	0.007	1	0	229.64242	232.419825	-2.7774046	-1.2094
1000	1000	0.0006	0.007	1	0	210.74016	212.169301	-1.4291413	-0.6782
1000	1000	0.0007	0.007	1	0	195.8279	196.430604	-0.6027037	-0.3078
1000	1000	0.0008	0.007	1	0	183.69058	183.744005	-0.0534248	-0.0291
1000	1000	0.0009	0.007	1	0	173.56869	173.235509	0.3331809	0.19196
1000	1000	0.001	0.007	1	0	164.96256	164.345634	0.6169259	0.37398
1000	1000	0.0015	0.007	1	0	135.46847	134.187648	1.2808217	0.94548
1000	1000	0.002	0.007	1	0	117.79361	116.209912	1.5836977	1.34447
1000	1000	0.0025	0.007	1	0	105.69631	103.941305	1.7550046	1.66042
1000	1000	0.003	0.007	1	0	96.75993	94.8849961	1.87493392	1.93772
1000	1000	0.0035	0.007	1	0	89.81607	87.8464365	1.96963346	2.19296
1000	1000	0.004	0.007	1	0	84.22233	82.172817	2.04951296	2.43346
1000	1000	0.0045	0.007	1	0	79.59268	77.4732749	2.11940512	2.66281
1000	1000	0.005	0.007	1	0	75.67944	73.4976019	2.18183808	2.883
1000	1000	0.0055	0.007	1	0	72.31556	70.0772138	2.23834617	3.09525
1000	1000	0.006	0.007	1	0	69.38372	67.0938242	2.28989584	3.30034
1000	1000	0.0065	0.007	1	0	66.79891	64.4616612	2.33724883	3.49893
1000	1000	0.007	0.007	1	0	64.49776	62.116811	2.38094902	3.69152
3000	1000	0.007	0.007	1.1	0.2	158.35473	150.928562	7.426168	4.68958
3000	1000	0.007	0.007	1.2	0.3	130.65498	123.586664	7.0683163	5.40991
3000	1000	0.007	0.007	1.3	0.4	108.09925	101.445282	6.6539685	6.15543
1000	1000	0.0075	0.007	1	0	62.432	60.0105407	2.42145932	3.87855
1000	1000	0.008	0.007	1	0	60.56405	58.1049562	2.45909384	4.06032
3000	1000	0.008	0.007	1.05	0.2	162.93439	154.946665	7.9877251	4.90242
3000	1000	0.008	0.007	1.1	0.3	145.55559	137.579193	7.9763974	5.47997
3000	1000	0.008	0.007	1.2	0.4	118.77378	111.367915	7.4058647	6.23527
1000	1000	0.0085	0.007	1	0	58.86419	56.3700874	2.49410256	4.23705
1000	1000	0.009	0.007	1	0	57.30857	54.781878	2.52669197	4.40893
3000	1000	0.009	0.007	1.05	0.2	154.26083	146.085117	8.1757134	5.29993
3000	1000	0.009	0.007	1	0.3	165.92032	156.950197	8.9701228	5.40628
1000	1000	0.0095	0.007	1	0	55.87785	53.3207646	2.55708536	4.57621
1000	1000	0.01	0.007	1	0	54.55611	51.9706527	2.58545728	4.73908

3000	1000	0.01	0.007	1	0.3	158.04109	148.896031	9.1450593	5.78651
3000	1000	0.01	0.007	1	0.4	152.75081	143.439108	9.3117019	6.09601
1000	1000	0.015	0.007	1	0	45.22248	42.4338603	2.78861974	6.16645
1000	1000	0.02	0.007	1	0	39.65674	36.748801	2.90793904	7.33277
1000	1000	0.025	0.007	1	0	35.8567	32.8691268	2.98757318	8.33198
1000	1000	0.03	0.007	1	0	33.04982	30.0052703	3.04454966	9.212
1000	1000	0.0005	0.0075	1	0	221.26147	224.538883	-3.2774128	-1.4812
1000	1000	0.0006	0.0075	1	0	203.18339	204.975019	-1.7916286	-0.8818
1000	1000	0.0007	0.0075	1	0	188.89406	189.769992	-0.8759322	-0.4637
1000	1000	0.0008	0.0075	1	0	177.24824	177.513573	-0.2653332	-0.1497
1000	1000	0.0009	0.0075	1	0	167.52664	167.361402	0.1652382	0.09863
1000	1000	0.001	0.0075	1	0	159.25455	158.772967	0.4815833	0.3024
1000	1000	0.0015	0.0075	1	0	130.91366	129.637584	1.2760756	0.97475
1000	1000	0.002	0.0075	1	0	113.86205	112.269441	1.5926086	1.39872
1000	1000	0.0025	0.0075	1	0	102.18748	100.416841	1.7706389	1.73274
1000	1000	0.003	0.0075	1	0	93.56241	91.6676151	1.89479495	2.02517
1000	1000	0.0035	0.0075	1	0	86.86044	84.8677205	1.99271949	2.29416
1000	1000	0.004	0.0075	1	0	81.46188	79.3864833	2.07539666	2.54769
1000	1000	0.0045	0.0075	1	0	76.99419	74.8462943	2.14789573	2.78969
1000	1000	0.005	0.0075	1	0	73.21828	71.0054293	2.21285071	3.02227
1000	1000	0.0055	0.0075	1	0	69.97284	67.7010205	2.27181953	3.24672
1000	1000	0.006	0.0075	1	0	67.14458	64.8187922	2.32578778	3.46385
1000	1000	0.0065	0.0075	1	0	64.65137	62.2758812	2.37548882	3.67431
1000	1000	0.007	0.0075	1	0	62.432	60.0105407	2.42145932	3.87855
1000	1000	0.0075	0.0075	1	0	60.43986	57.9756903	2.46416975	4.07706
3000	3000	0.0075	0.0075	1	0.4	56.30973	53.3376746	2.97205536	5.27805
3000	3000	0.0075	0.0075	1.1	0.2	49.50398	46.9555527	2.54842735	5.14792
3000	3000	0.0075	0.0075	1.2	0.3	40.87186	38.4491843	2.42267574	5.92749
1000	1000	0.008	0.0075	1	0	58.63871	56.1347207	2.5039893	4.2702
1000	1000	0.0085	0.0075	1	0	56.99985	54.4586783	2.54117171	4.45821
1000	1000	0.009	0.0075	1	0	55.50025	52.9243222	2.57592778	4.64129
3000	3000	0.009	0.0075	1	0.4	51.7836	48.6904126	3.09318736	5.9733
1000	1000	0.0095	0.0075	1	0	54.12118	51.5127526	2.60842742	4.81961
1000	1000	0.01	0.0075	1	0	52.84728	50.2084206	2.63885945	4.99337
3000	3000	0.01	0.0075	1	0.4	49.35245	46.1917812	3.16066877	6.40428
1000	1000	0.015	0.0075	1	0	43.85372	40.9950037	2.85871628	6.51875
1000	1000	0.02	0.0075	1	0	38.49103	35.5027147	2.98831535	7.76367
1000	1000	0.025	0.0075	1	0	34.8297	31.7545933	3.07510667	8.82898
1000	1000	0.03	0.0075	1	0	32.12541	28.9878451	3.13756488	9.76661
1000	1000	0.0005	0.008	1	0	213.93527	217.408838	-3.4735684	-1.6237
1000	1000	0.0006	0.008	1	0	196.53471	198.466208	-1.9314983	-0.9828

1000	1000	0.0007	0.008	1	0	182.76553	183.744005	-0.9784748	-0.5354
1000	1000	0.0008	0.008	1	0	171.535	171.876778	-0.3417782	-0.1992
1000	1000	0.0009	0.008	1	0	162.15479	162.046981	0.1078095	0.06649
1000	1000	0.001	0.008	1	0	154.16968	153.731264	0.4384161	0.28437
1000	1000	0.0015	0.008	1	0	126.7902	125.521051	1.2691486	1.00098
1000	1000	0.002	0.008	1	0	110.30355	108.704419	1.5991308	1.44975
1000	1000	0.0025	0.008	1	0	99.01201	97.2281883	1.78382168	1.80162
1000	1000	0.003	0.008	1	0	90.66896	88.7567866	1.91217338	2.10896
1000	1000	0.0035	0.008	1	0	84.1861	82.172817	2.01328296	2.39147
1000	1000	0.004	0.008	1	0	78.96432	76.865632	2.09868803	2.65777
1000	1000	0.0045	0.008	1	0	74.64333	72.4696128	2.17371719	2.91214
1000	1000	0.005	0.008	1	0	70.99184	68.7507113	2.24112871	3.15688
1000	1000	0.0055	0.008	1	0	67.85372	65.5512312	2.3024888	3.39331
1000	1000	0.006	0.008	1	0	65.11936	62.7605257	2.35883431	3.62232
1000	1000	0.0065	0.008	1	0	62.70922	60.2983627	2.41085733	3.8445
1000	1000	0.007	0.008	1	0	60.56405	58.1049562	2.45909384	4.06032
1000	1000	0.0075	0.008	1	0	58.63871	56.1347207	2.5039893	4.2702
1000	1000	0.008	0.008	1	0	56.89813	54.3522096	2.54592039	4.47452
3000	3000	0.008	0.008	1.1	0.2	46.64126	44.0208306	2.62042943	5.61826
3000	3000	0.008	0.008	1.2	0.3	38.53437	36.0461102	2.48825976	6.45725
3000	3000	0.008	0.008	1.2	0	39.87819	37.7446181	2.13357195	5.35022
3000	3000	0.008	0.008	1.2	0.2	39.37202	36.9897257	2.38229431	6.05073
3000	3000	0.008	0.008	1.2	0.4	37.26774	34.7250486	2.54269139	6.82277
1000	1000	0.0085	0.008	1	0	55.31459	52.7293885	2.58520148	4.67363
1000	1000	0.009	0.008	1	0	53.86581	51.2437547	2.62205535	4.86775
3000	3000	0.009	0.008	1	0.4	50.28652	47.1442893	3.14223068	6.24865
1000	1000	0.0095	0.008	1	0	52.53365	49.8770082	2.65664178	5.05703
1000	1000	0.01	0.008	1	0	51.30321	48.6140942	2.68911584	5.24161
3000	3000	0.01	0.008	1	0.4	47.9388	44.7249999	3.21380012	6.70396
1000	1000	0.015	0.008	1	0	42.61917	39.6932417	2.92592833	6.86529
1000	1000	0.02	0.008	1	0	37.44132	34.3753556	3.06596436	8.18872
1000	1000	0.025	0.008	1	0	33.90603	30.7462528	3.15977721	9.31922
1000	1000	0.03	0.008	1	0	31.29491	28.0673604	3.22754965	10.3133
1000	1000	0.0005	0.0085	1	0	207.25387	210.917554	-3.6636841	-1.7677
1000	1000	0.0006	0.0085	1	0	190.47221	192.540504	-2.0682936	-1.0859
1000	1000	0.0007	0.0085	1	0	177.17823	178.257868	-1.0796382	-0.6094
1000	1000	0.0008	0.0085	1	0	166.32709	166.744967	-0.4178773	-0.2512
1000	1000	0.0009	0.0085	1	0	157.2587	157.208663	0.0500372	0.03182
1000	1000	0.001	0.0085	1	0	149.53568	149.141233	0.3944473	0.26378
1000	1000	0.0015	0.0085	1	0	123.03375	121.773307	1.2604434	1.02447
1000	1000	0.002	0.0085	1	0	107.06243	105.458777	1.603653	1.49787

1000	1000	0.0025	0.0085	1	0	96.12014	94.3251977	1.79494229	1.86739
1000	1000	0.003	0.0085	1	0	88.03416	86.1067309	1.92742913	2.18941
1000	1000	0.0035	0.0085	1	0	81.751	79.7193422	2.03165783	2.48518
1000	1000	0.004	0.0085	1	0	76.69034	74.5706164	2.11972363	2.764
1000	1000	0.0045	0.0085	1	0	72.50306	70.3058514	2.19720865	3.0305
1000	1000	0.005	0.0085	1	0	68.96496	66.6979869	2.26697307	3.28714
1000	1000	0.0055	0.0085	1	0	65.92471	63.5940353	2.33067468	3.53536
1000	1000	0.006	0.0085	1	0	63.27598	60.8866533	2.38932669	3.77604
1000	1000	0.0065	0.0085	1	0	60.94163	58.4980043	2.44362569	4.00978
1000	1000	0.007	0.0085	1	0	58.86419	56.3700874	2.49410256	4.23705
1000	1000	0.0075	0.0085	1	0	56.99985	54.4586783	2.54117171	4.45821
1000	1000	0.008	0.0085	1	0	55.31459	52.7293885	2.58520148	4.67363
1000	1000	0.0085	0.0085	1	0	53.78154	51.1550208	2.62651919	4.88368
1000	1000	0.009	0.0085	1	0	52.37913	49.7137443	2.66538575	5.08864
1000	1000	0.0095	0.0085	1	0	51.08979	48.3878055	2.70198455	5.2887
1000	1000	0.01	0.0085	1	0	49.89907	47.1625989	2.73647115	5.48401
1000	1000	0.015	0.0085	1	0	41.49857	38.5081007	2.99046929	7.2062
1000	1000	0.02	0.0085	1	0	36.49017	33.3489935	3.14117653	8.60828
1000	1000	0.025	0.0085	1	0	33.07023	29.8282466	3.24198345	9.80333
1000	1000	0.03	0.0085	1	0	30.54427	27.2293391	3.31493086	10.8529
1000	1000	0.0005	0.009	1	0	201.12729	204.975019	-3.8477286	-1.9131
1000	1000	0.0006	0.009	1	0	184.91394	187.115736	-2.2017957	-1.1907
1000	1000	0.0007	0.009	1	0	172.05639	173.235509	-1.1791191	-0.6853
1000	1000	0.0008	0.009	1	0	161.55368	162.046981	-0.4933005	-0.3053
1000	1000	0.0009	0.009	1	0	152.77163	152.779358	-0.0077284	-0.0051
1000	1000	0.001	0.009	1	0	145.28925	144.939226	0.3500244	0.24092
1000	1000	0.0015	0.009	1	0	119.59268	118.342382	1.2502978	1.04546
1000	1000	0.002	0.009	1	0	104.09401	102.487509	1.6065007	1.54332
1000	1000	0.0025	0.009	1	0	93.4719	91.6676151	1.80428495	1.9303
1000	1000	0.003	0.009	1	0	85.62156	83.6807009	1.94085908	2.26679
1000	1000	0.0035	0.009	1	0	79.5214	77.4732749	2.04812512	2.57556
1000	1000	0.004	0.009	1	0	74.60839	72.4696128	2.13877719	2.86667
1000	1000	0.0045	0.009	1	0	70.54364	68.3250062	2.21863381	3.14505
1000	1000	0.005	0.009	1	0	67.10947	64.8187922	2.29067778	3.41335
1000	1000	0.0055	0.009	1	0	64.15892	61.8022935	2.35662654	3.67311
1000	1000	0.006	0.009	1	0	61.5887	59.1711911	2.41750892	3.92525
1000	1000	0.0065	0.009	1	0	59.32387	56.8498415	2.47402849	4.17038
1000	1000	0.007	0.009	1	0	57.30857	54.781878	2.52669197	4.40893
1000	1000	0.0075	0.009	1	0	55.50025	52.9243222	2.57592778	4.64129
1000	1000	0.008	0.009	1	0	53.86581	51.2437547	2.62205535	4.86775
1000	1000	0.0085	0.009	1	0	52.37913	49.7137443	2.66538575	5.08864

1000	1000	0.009	0.009	1	0	51.01928	48.3130752	2.7062048	5.30428
1000	1000	0.0095	0.009	1	0	49.76924	47.0244943	2.74474569	5.51494
1000	1000	0.01	0.009	1	0	48.61498	45.8338075	2.78117248	5.72081
1000	1000	0.015	0.009	1	0	40.48429	37.4231471	3.06114287	7.56131
1000	1000	0.02	0.009	1	0	35.63685	32.4093961	3.22745389	9.05651
1000	1000	0.025	0.009	1	0	32.32946	28.9878451	3.34161488	10.3361
1000	1000	0.03	0.009	1	0	29.88876	26.4621611	3.42659889	11.4645
1000	1000	0.0005	0.0095	1	0	195.48232	199.508033	-4.0257129	-2.0594
1000	1000	0.0006	0.0095	1	0	179.7932	182.125083	-2.3318833	-1.297
1000	1000	0.0007	0.0095	1	0	167.33834	168.615063	-1.2767228	-0.763
1000	1000	0.0008	0.0095	1	0	157.15714	157.724949	-0.5678088	-0.3613
1000	1000	0.0009	0.0095	1	0	148.63929	148.704508	-0.0652178	-0.0439
1000	1000	0.001	0.0095	1	0	141.37889	141.073483	0.3054071	0.21602
1000	1000	0.0015	0.0095	1	0	116.42501	115.186017	1.2389935	1.0642
1000	1000	0.002	0.0095	1	0	101.36194	99.7540164	1.60792357	1.58632
1000	1000	0.0025	0.0095	1	0	91.03481	89.2227047	1.81210529	1.99056
1000	1000	0.003	0.0095	1	0	83.4015	81.4488134	1.95268665	2.34131
1000	1000	0.0035	0.0095	1	0	77.46989	75.4069485	2.0629415	2.66289
1000	1000	0.004	0.0095	1	0	72.69284	70.5367415	2.15609853	2.96604
1000	1000	0.0045	0.0095	1	0	68.74091	66.5026776	2.23823238	3.25604
1000	1000	0.005	0.0095	1	0	65.40245	63.0899795	2.31247046	3.53576
1000	1000	0.0055	0.0095	1	0	62.53451	60.1539352	2.38057476	3.80682
1000	1000	0.006	0.0095	1	0	60.03662	57.5930082	2.44361176	4.0702
1000	1000	0.0065	0.0095	1	0	57.83585	55.3335725	2.50227751	4.32652
1000	1000	0.007	0.0095	1	0	55.87785	53.3207646	2.55708536	4.57621
1000	1000	0.0075	0.0095	1	0	54.12118	51.5127526	2.60842742	4.81961
1000	1000	0.008	0.0095	1	0	52.53365	49.8770082	2.65664178	5.05703
1000	1000	0.0085	0.0095	1	0	51.08979	48.3878055	2.70198455	5.2887
1000	1000	0.009	0.0095	1	0	49.76924	47.0244943	2.74474569	5.51494
1000	1000	0.0095	0.0095	1	0	48.55545	45.7702818	2.78516823	5.73606
1000	1000	0.01	0.0095	1	0	47.43481	44.6113524	2.82345765	5.95229
1000	1000	0.015	0.0095	1	0	39.53706	36.4250167	3.11204333	7.87121
1000	1000	0.02	0.0095	1	0	34.83019	31.5449898	3.28520023	9.43205
1000	1000	0.025	0.0095	1	0	31.61476	28.2146966	3.40006341	10.7547
1000	1000	0.03	0.0095	1	0	29.23956	25.7563763	3.48318371	11.9126
1000	1000	0.0005	0.01	1	0	190.25864	194.456377	-4.1977366	-2.2063
1000	1000	0.0006	0.01	1	0	175.05508	177.513573	-2.4584932	-1.4044
1000	1000	0.0007	0.01	1	0	162.97334	164.345634	-1.3722941	-0.842
1000	1000	0.0008	0.01	1	0	153.09005	153.731264	-0.6412139	-0.4188
1000	1000	0.0009	0.01	1	0	144.81698	144.939226	-0.1222456	-0.0844
1000	1000	0.001	0.01	1	0	137.76225	137.501423	0.2608274	0.18933

1000	1000	0.0015	0.01	1	0	113.4962	112.269441	1.2267586	1.08088
1000	1000	0.002	0.01	1	0	98.83633	97.2281883	1.60814168	1.62708
1000	1000	0.0025	0.01	1	0	88.78215	86.9635354	1.81861463	2.0484
1000	1000	0.003	0.01	1	0	81.34962	79.3864833	1.96313666	2.41321
1000	1000	0.0035	0.01	1	0	75.57391	73.4976019	2.07630808	2.74739
1000	1000	0.004	0.01	1	0	70.9226	68.7507113	2.17188871	3.06234
1000	1000	0.0045	0.01	1	0	67.07502	64.8187922	2.25622778	3.36374
1000	1000	0.005	0.01	1	0	63.82507	61.4925056	2.33256442	3.65462
1000	1000	0.0055	0.01	1	0	61.03354	58.6308036	2.40273642	3.93675
1000	1000	0.006	0.01	1	0	58.60255	56.1347207	2.4678293	4.21113
1000	1000	0.0065	0.01	1	0	56.46107	53.9324951	2.52857486	4.47844
1000	1000	0.007	0.01	1	0	54.55611	51.9706527	2.58545728	4.73908
1000	1000	0.0075	0.01	1	0	52.84728	50.2084206	2.63885945	4.99337
1000	1000	0.008	0.01	1	0	51.30321	48.6140942	2.68911584	5.24161
1000	1000	0.0085	0.01	1	0	49.89907	47.1625989	2.73647115	5.48401
1000	1000	0.009	0.01	1	0	48.61498	45.8338075	2.78117248	5.72081
1000	1000	0.0095	0.01	1	0	47.43481	44.6113524	2.82345765	5.95229
1000	1000	0.01	0.01	1	0	46.34532	43.4817677	2.86355232	6.17873
3000	3000	0.01	0.01	1	0.1	46.31198	43.264391	3.047589	6.58056
3000	3000	0.01	0.01	1	0.2	45.80953	42.612164	3.197366	6.9797
3000	3000	0.01	0.01	1	0.3	44.85152	41.525119	3.326401	7.41647
3000	3000	0.01	0.01	1	0.4	43.39959	40.003256	3.396334	7.82573
1000	1000	0.015	0.01	1	0	38.67201	35.5027147	3.16929535	8.19532
1000	1000	0.02	0.01	1	0	34.10056	30.7462528	3.35430721	9.83652
1000	1000	0.025	0.01	1	0	30.97665	27.5002845	3.47636549	11.2225
1000	1000	0.03	0.01	1	0	28.66873	25.1042103	3.56451972	12.4335
1000	1000	0.0005	0.015	1	0	153.14707	158.772967	-5.6258967	-3.6735
1000	1000	0.0006	0.015	1	0	141.39899	144.939226	-3.5402356	-2.5037
1000	1000	0.0007	0.015	1	0	131.97852	134.187648	-2.2091283	-1.6739
1000	1000	0.0008	0.015	1	0	124.22203	125.521051	-1.2990214	-1.0457
1000	1000	0.0009	0.015	1	0	117.69695	118.342382	-0.6454322	-0.5484
1000	1000	0.001	0.015	1	0	112.1106	112.269441	-0.1588414	-0.1417
1000	1000	0.0015	0.015	1	0	92.74968	91.6676151	1.08206495	1.16665
1000	1000	0.002	0.015	1	0	80.95915	79.3864833	1.57266666	1.94254
1000	1000	0.0025	0.015	1	0	72.84489	71.0054293	1.83946071	2.52517
1000	1000	0.003	0.015	1	0	66.83822	64.8187922	2.01942778	3.02137
1000	1000	0.0035	0.015	1	0	62.16895	60.0105407	2.15840932	3.47184
1000	1000	0.004	0.015	1	0	58.4096	56.1347207	2.2748793	3.8947
1000	1000	0.0045	0.015	1	0	55.30182	52.9243222	2.37749778	4.29913
1000	1000	0.005	0.015	1	0	52.67918	50.2084206	2.47075945	4.6902
1000	1000	0.0055	0.015	1	0	50.42906	47.8718507	2.55720934	5.0709

1000	1000	0.006	0.015	1	0	48.47221	45.8338075	2.63840248	5.44312
1000	1000	0.0065	0.015	1	0	46.75103	44.0356979	2.71533212	5.80807
1000	1000	0.007	0.015	1	0	45.22248	42.4338603	2.78861974	6.16645
1000	1000	0.0075	0.015	1	0	43.85372	40.9950037	2.85871628	6.51875
1000	1000	0.008	0.015	1	0	42.61917	39.6932417	2.92592833	6.86529
1000	1000	0.0085	0.015	1	0	41.49857	38.5081007	2.99046929	7.2062
1000	1000	0.009	0.015	1	0	40.47561	37.4231471	3.05246287	7.54149
1000	1000	0.0095	0.015	1	0	39.53706	36.4250167	3.11204333	7.87121
1000	1000	0.01	0.015	1	0	38.67201	35.5027147	3.16929535	8.19532
1000	1000	0.015	0.015	1	0	32.61995	28.9878451	3.63210488	11.1346
1000	1000	0.02	0.015	1	0	29.0561	25.1042103	3.95188972	13.6009
1000	1000	0.025	0.015	1	0	26.61718	22.4538883	4.16329172	15.6414
1000	1000	0.03	0.015	1	0	24.80368	20.4975019	4.30617814	17.361
1000	1000	0.0005	0.02	1	0	130.85137	137.501423	-6.6500526	-5.0821
1000	1000	0.0006	0.02	1	0	121.17256	125.521051	-4.3484914	-3.5887
1000	1000	0.0007	0.02	1	0	113.35495	116.209912	-2.8549623	-2.5186
1000	1000	0.0008	0.02	1	0	106.8832	108.704419	-1.8212192	-1.7039
1000	1000	0.0009	0.02	1	0	101.41551	102.487509	-1.0719993	-1.057
1000	1000	0.001	0.02	1	0	96.71784	97.2281883	-0.5103483	-0.5277
1000	1000	0.0015	0.02	1	0	80.32306	79.3864833	0.93657666	1.16601
1000	1000	0.002	0.02	1	0	70.26297	68.7507113	1.51225871	2.15228
1000	1000	0.0025	0.02	1	0	63.31648	61.4925056	1.82397442	2.88073
1000	1000	0.003	0.02	1	0	58.16728	56.1347207	2.0325593	3.49433
1000	1000	0.0035	0.02	1	0	54.16293	51.9706527	2.19227728	4.04756
1000	1000	0.004	0.02	1	0	50.9393	48.6140942	2.32520584	4.56466
1000	1000	0.0045	0.02	1	0	48.27554	45.8338075	2.44173248	5.05791
1000	1000	0.005	0.02	1	0	46.02909	43.4817677	2.54732232	5.53416
1000	1000	0.0055	0.02	1	0	44.10336	41.4582388	2.6451212	5.99755
1000	1000	0.006	0.02	1	0	42.4303	39.6932417	2.73705833	6.45072
1000	1000	0.0065	0.02	1	0	40.96041	38.136033	2.82437696	6.89538
1000	1000	0.007	0.02	1	0	39.65674	36.748801	2.90793904	7.33277
1000	1000	0.0075	0.02	1	0	38.49104	35.5027147	2.98832535	7.76369
1000	1000	0.008	0.02	1	0	37.44132	34.3753556	3.06596436	8.18872
1000	1000	0.0085	0.02	1	0	36.49017	33.3489935	3.14117653	8.60828
1000	1000	0.009	0.02	1	0	35.62359	32.4093961	3.21419389	9.02266
1000	1000	0.0095	0.02	1	0	34.83019	31.5449898	3.28520023	9.43205
1000	1000	0.01	0.02	1	0	34.10056	30.7462528	3.35430721	9.83652
1000	1000	0.015	0.02	1	0	29.0561	25.1042103	3.95188972	13.6009
1000	1000	0.02	0.02	1	0	26.13433	21.7408838	4.39344616	16.811
1000	1000	0.025	0.02	1	0	24.17	19.4456377	4.72436234	19.5464
1000	1000	0.03	0.02	1	0	22.70401	17.7513573	4.95265268	21.814

1000	1000	0.0005	0.025	1	0	115.57159	122.985011	-7.4134212	-6.4146
1000	1000	0.0006	0.025	1	0	107.29933	112.269441	-4.9701114	-4.632
1000	1000	0.0007	0.025	1	0	100.5779	103.941305	-3.3634054	-3.3441
1000	1000	0.0008	0.025	1	0	94.988	97.2281883	-2.2401883	-2.3584
1000	1000	0.0009	0.025	1	0	90.24765	91.6676151	-1.4199651	-1.5734
1000	1000	0.001	0.025	1	0	86.16201	86.9635354	-0.8015254	-0.9303
1000	1000	0.0015	0.025	1	0	71.81115	71.0054293	0.80572071	1.122
1000	1000	0.002	0.025	1	0	62.94192	61.4925056	1.44941442	2.30278
1000	1000	0.0025	0.025	1	0	56.79803	55.000569	1.79746097	3.16465
1000	1000	0.003	0.025	1	0	52.2377	50.2084206	2.02927945	3.8847
1000	1000	0.0035	0.025	1	0	48.68981	46.4839649	2.20584507	4.5304
1000	1000	0.004	0.025	1	0	45.83384	43.4817677	2.35207232	5.13174
1000	1000	0.0045	0.025	1	0	43.47474	40.9950037	2.47973628	5.70386
1000	1000	0.005	0.025	1	0	41.48633	38.8912753	2.59505467	6.2552
1000	1000	0.0055	0.025	1	0	39.783	37.0813761	2.70162393	6.7909
1000	1000	0.006	0.025	1	0	38.30439	35.5027147	2.80167535	7.31424
1000	1000	0.0065	0.025	1	0	37.00657	34.1099049	2.89666509	7.82743
1000	1000	0.007	0.025	1	0	35.8567	32.8691268	2.98757318	8.33198
1000	1000	0.0075	0.025	1	0	34.8297	31.7545933	3.07510667	8.82898
1000	1000	0.008	0.025	1	0	33.90603	30.7462528	3.15977721	9.31922
1000	1000	0.0085	0.025	1	0	33.07023	29.8282466	3.24198345	9.80333
1000	1000	0.009	0.025	1	0	32.30984	28.9878451	3.32199488	10.2817
1000	1000	0.0095	0.025	1	0	31.61476	28.2146966	3.40006341	10.7547
1000	1000	0.01	0.025	1	0	30.97665	27.5002845	3.47636549	11.2225
1000	1000	0.015	0.025	1	0	26.62963	22.4538883	4.17574172	15.6808
1000	1000	0.02	0.025	1	0	24.17428	19.4456377	4.72864234	19.5606
1000	1000	0.025	0.025	1	0	22.55268	17.3927071	5.15997293	22.8796
1000	1000	0.03	0.025	1	0	21.37544	15.8772967	5.49814333	25.7218
1000	1000	0.0005	0.03	1	0	104.91494	112.269441	-7.3545014	-7.01
1000	1000	0.0006	0.03	1	0	97.52432	102.487509	-4.9631893	-5.0892
1000	1000	0.0007	0.03	1	0	91.50834	94.8849961	-3.3766561	-3.69
1000	1000	0.0008	0.03	1	0	86.49777	88.7567866	-2.2590166	-2.6116
1000	1000	0.0009	0.03	1	0	82.24303	83.6807009	-1.4376709	-1.7481
1000	1000	0.001	0.03	1	0	78.57126	79.3864833	-0.8152233	-1.0376
1000	1000	0.0015	0.03	1	0	65.50757	64.8187922	0.68877778	1.05145
1000	1000	0.002	0.03	1	0	57.52372	56.1347207	1.3889993	2.41465
1000	1000	0.0025	0.03	1	0	51.97588	50.2084206	1.76745945	3.40054
1000	1000	0.003	0.03	1	0	47.85254	45.8338075	2.01873248	4.21865
1000	1000	0.0035	0.03	1	0	44.64321	42.4338603	2.20934974	4.9489
1000	1000	0.004	0.03	1	0	42.05983	39.6932417	2.36658833	5.62672
1000	1000	0.0045	0.03	1	0	39.92656	37.4231471	2.50341287	6.27004

1000	1000	0.005	0.03	1	0	38.12939	35.5027147	2.62667535	6.88885
1000	1000	0.0055	0.03	1	0	36.59085	33.8505102	2.74033977	7.48914
1000	1000	0.006	0.03	1	0	35.25628	32.4093961	2.84688389	8.07483
1000	1000	0.0065	0.03	1	0	34.08586	31.1379406	2.94791941	8.64851
1000	1000	0.007	0.03	1	0	33.04982	30.0052703	3.04454966	9.212
1000	1000	0.0075	0.03	1	0	32.12541	28.9878451	3.13756488	9.76661
1000	1000	0.008	0.03	1	0	31.29491	28.0673604	3.22754965	10.3133
1000	1000	0.0085	0.03	1	0	30.54427	27.2293391	3.31493086	10.8529
1000	1000	0.009	0.03	1	0	29.86222	26.4621611	3.40005889	11.3858
1000	1000	0.0095	0.03	1	0	29.23956	25.7563763	3.48318371	11.9126
1000	1000	0.01	0.03	1	0	28.66873	25.1042103	3.56451972	12.4335
1000	1000	0.015	0.03	1	0	24.80368	20.4975019	4.30617814	17.361
1000	1000	0.02	0.03	1	0	22.70401	17.7513573	4.95265268	21.814
1000	1000	0.025	0.03	1	0	21.37223	15.8772967	5.49493333	25.7106
1000	1000	0.03	0.03	1	0	20.41536	14.4939226	5.92143744	29.0048

Bijlage 7: Invloed van de dwarscontractie op koepels met verschillende krommingen

In dit gedeelte van het verslag wordt de invloed van de dwarscontractiecoefficient (de poisson ratio) op de zakking onderzocht. Tot nu toe was de invloed van de poisson ratio in de berekeningen verwaarloosd door een waarde van nu= 0 in te voeren in ANSYS. De formule die nu gevonden is beschrijft dus het verband tussen w, t, k1, k2, E, P bij een dwarscontractie v=0.

$w \sim f(t,k1,k2,E,P)$

Waarbij v tot nu toe was weggelaten.
Stel dat er een functie zou bestaan die de invloed van de dwarscontractie in rekening brengt. Dat functie wordt C(v) genoemd. De totale formule inclusief dwarscontractie kan nu als volgt geschreven worden:

$w \sim C(v)* f(t,k1,k2,E, P)$

De vergelijking van hierboven kan ook anders worden geschreven:

$w (ANSYS) / f(t,k1,k2,E,P) = C(v)$

Dus als de variabelen t,k1,k2,E en P zowel bij ANSYS als bij de formule constant worden gehouden, terwijl de waarde van poisson ratio (in ANSYS) gelijk aan nul wordt gesteld, zal de uitkomst van de vergelijking van hierboven 1 moeten zijn. (Tenminste in het geval dat de formule erg nauwkeurig is.)
Als een andere waarde voor nu wordt ingevuld in de ANSYS, zal de uitkomst van de verhouding van hierboven niet meer 1 zijn maar kleiner dan 1. Deze verhouding zou dus een indicatie geven voor de waarde van de poisson ratio.
Helaas omdat de formule niet heel erg nauwkeurig is, en omdat de constanten in de formule soms een klein beetje zijn afgerond, schommelt de waarde een beetje tussen de werkelijke oplossing en is het gebruik van de formule niet echt voor de hand liggend.
Er is echter een andere oplossing hiervoor. De variabelen t,k1,k2,E en P worden in Ansys weer als constanten waardes gekozen. De bijbehorende waarde van de zakking net onder de puntlast wordt dan berekend met behulp van de ANSYS, eerst met nu=0. Dit wordt w (ANSYS 0) genoemd in de tabellen en is als het ware de waarde die de formule ook hoort te geven.
De volgende stap is dan om alleen de poisson ratio te laten veranderen van 0 tot 0.5 terwijl alle andere waardes constant blijven. Dit wordt w(ANSYS) genoemd in de tabellen.

	K1=0.0005 K2= 0.0005	K1=0.0006 K2=0.0006	K1=0.0007 K2=0.0007	K1=0.0008 K2=0.0008
v (nu)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)
0.00000	1.00000	1.00000	1.00000	1.00000
0.01000	0.99997	0.99997	0.99998	1.00027
0.02000	0.99983	0.99984	0.99985	1.00045
0.03000	0.99960	0.99962	0.99963	1.00054
0.04000	0.99927	0.99929	0.99931	1.00053
0.05000	0.99883	0.99886	0.99889	1.00043
0.06000	0.99830	0.99833	0.99837	1.00024
0.07000	0.99767	0.99771	0.99774	0.99996
0.08000	0.99693	0.99698	0.99702	0.99958
0.09000	0.99610	0.99615	0.99620	0.99911
0.10000	0.99516	0.99522	0.99528	0.99855
0.11000	0.99412	0.99419	0.99425	0.99789
0.12000	0.99299	0.99306	0.99312	0.99714
0.13000	0.99174	0.99182	0.99190	0.99630
0.14000	0.99040	0.99049	0.99057	0.99536
0.15000	0.98896	0.98905	0.98913	0.99432
0.16000	0.98741	0.98751	0.98760	0.99319
0.17000	0.98575	0.98586	0.98596	0.99197
0.18000	0.98400	0.98411	0.98421	0.99065
0.19000	0.98214	0.98225	0.98236	0.98923
0.20000	0.98017	0.98029	0.98041	0.98771
0.21000	0.97810	0.97823	0.97835	0.98610
0.22000	0.97592	0.97606	0.97619	0.98439
0.23000	0.97363	0.97378	0.97391	0.98258
0.24000	0.97123	0.97139	0.97153	0.98067
0.25000	0.96873	0.96889	0.96904	0.97865
0.26000	0.96611	0.96628	0.96644	0.97654
0.27000	0.96339	0.96357	0.96373	0.97433
0.28000	0.96055	0.96074	0.96091	0.97201
0.29000	0.95760	0.95779	0.95797	0.96958
0.30000	0.95454	0.95474	0.95492	0.96706
0.31000	0.95136	0.95157	0.95176	0.96442
0.32000	0.94806	0.94828	0.94848	0.96168
0.33000	0.94465	0.94488	0.94509	0.95883
0.34000	0.94112	0.94136	0.94157	0.95587
0.35000	0.93747	0.93771	0.93794	0.95281
0.36000	0.93370	0.93395	0.93418	0.94962
0.37000	0.92981	0.93006	0.93030	0.94633
0.38000	0.92579	0.92605	0.92630	0.94292
0.39000	0.92164	0.92192	0.92217	0.93940
0.40000	0.91737	0.91765	0.91792	0.93575

0.41000	0.91297	0.91326	0.91353	0.93199
0.42000	0.90843	0.90873	0.90901	0.92810
0.43000	0.90376	0.90408	0.90436	0.92410
0.44000	0.89896	0.89928	0.89958	0.91996
0.45000	0.89402	0.89435	0.89466	0.91570
0.46000	0.88894	0.88928	0.88959	0.91132
0.47000	0.88372	0.88406	0.88439	0.90680
0.48000	0.87835	0.87871	0.87904	0.90214
0.49000	0.87283	0.87320	0.87354	0.89735

	K1=0.0009 K2=0.0009	k1=0.001 K2=0.001	k1=0.002 K2=0.002	k1=0.003 K2=0.003
v (nu)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)
0.00000	1.00000	1.00000	1.00000	1.00000
0.01000	0.99999	0.99999	1.00003	1.00007
0.02000	0.99987	0.99988	0.99997	1.00004
0.03000	0.99966	0.99967	0.99980	0.99991
0.04000	0.99935	0.99937	0.99954	0.99969
0.05000	0.99894	0.99896	0.99917	0.99936
0.06000	0.99843	0.99845	0.99871	0.99894
0.07000	0.99781	0.99785	0.99815	0.99842
0.08000	0.99710	0.99714	0.99749	0.99780
0.09000	0.99629	0.99633	0.99672	0.99708
0.10000	0.99538	0.99543	0.99586	0.99626
0.11000	0.99436	0.99442	0.99490	0.99534
0.12000	0.99325	0.99331	0.99384	0.99432
0.13000	0.99203	0.99209	0.99268	0.99320
0.14000	0.99071	0.99078	0.99141	0.99199
0.15000	0.98929	0.98937	0.99005	0.99067
0.16000	0.98777	0.98785	0.98858	0.98924
0.17000	0.98614	0.98622	0.98701	0.98772
0.18000	0.98441	0.98450	0.98533	0.98610
0.19000	0.98257	0.98267	0.98356	0.98437
0.20000	0.98063	0.98073	0.98167	0.98253
0.21000	0.97858	0.97869	0.97969	0.98060
0.22000	0.97643	0.97654	0.97759	0.97856
0.23000	0.97417	0.97429	0.97540	0.97641
0.24000	0.97180	0.97193	0.97309	0.97416
0.25000	0.96932	0.96945	0.97067	0.97179
0.26000	0.96673	0.96687	0.96815	0.96933
0.27000	0.96404	0.96418	0.96552	0.96675
0.28000	0.96123	0.96138	0.96278	0.96406
0.29000	0.95831	0.95847	0.95992	0.96126
0.30000	0.95527	0.95544	0.95695	0.95835
0.31000	0.95212	0.95229	0.95387	0.95533
0.32000	0.94886	0.94904	0.95068	0.95219
0.33000	0.94548	0.94566	0.94736	0.94894
0.34000	0.94198	0.94217	0.94393	0.94557
0.35000	0.93836	0.93855	0.94039	0.94208
0.36000	0.93461	0.93482	0.93672	0.93847
0.37000	0.93075	0.93096	0.93293	0.93475
0.38000	0.92676	0.92698	0.92901	0.93090
0.39000	0.92265	0.92288	0.92498	0.92692

0.40000	0.91841	0.91865	0.92081	0.92282
0.41000	0.91404	0.91428	0.91652	0.91860
0.42000	0.90954	0.90979	0.91210	0.91424
0.43000	0.90491	0.90516	0.90754	0.90975
0.44000	0.90014	0.90040	0.90285	0.90513
0.45000	0.89523	0.89550	0.89803	0.90038
0.46000	0.89018	0.89046	0.89306	0.89548
0.47000	0.88500	0.88528	0.88796	0.89045
0.48000	0.87966	0.87996	0.88271	0.88527
0.49000	0.87418	0.87449	0.87731	0.87995

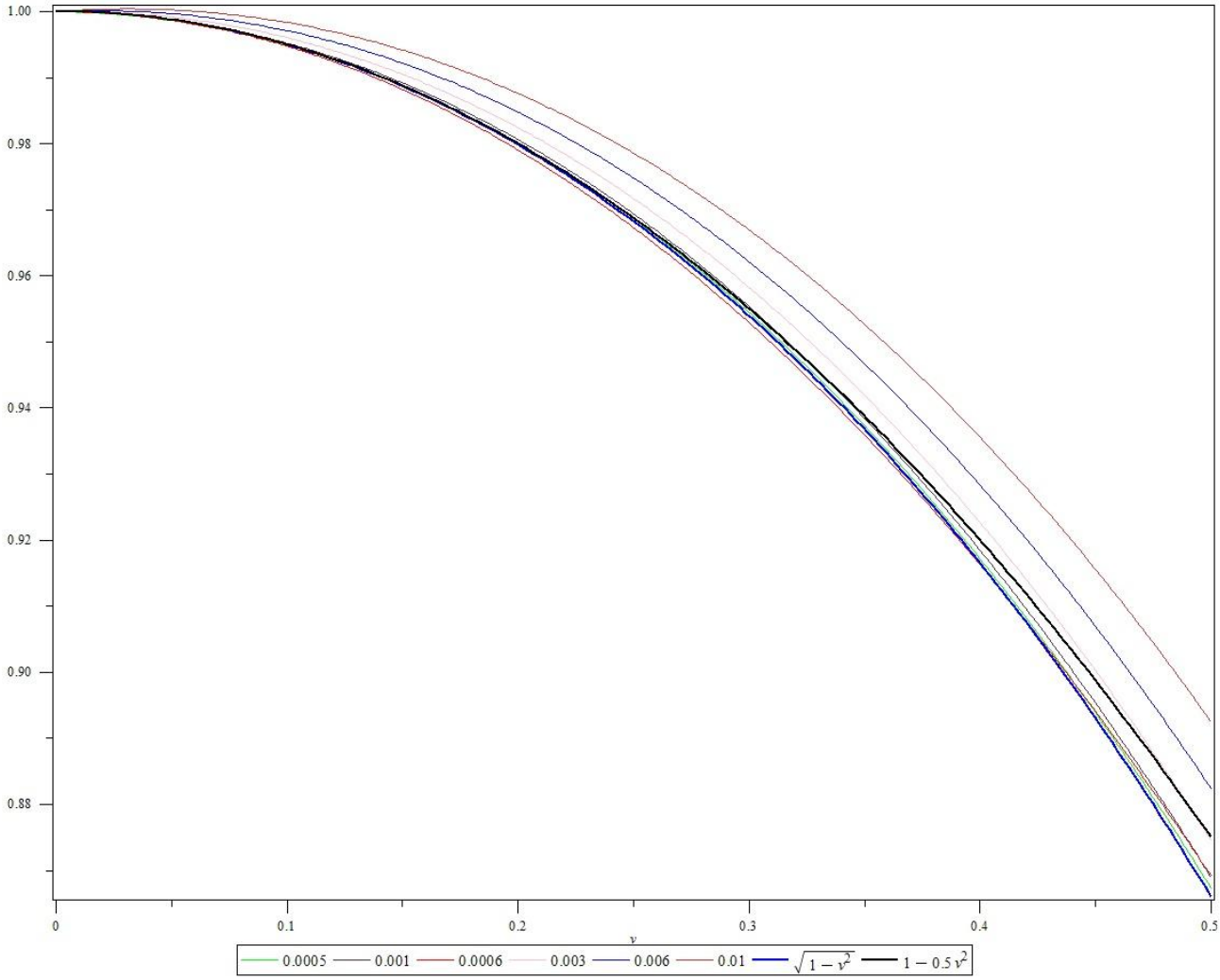
	K1=0.004 K2=0.004	K1=0.005 K2=0.005	K1=0.006 K2=0.006	K1=0.007 K2=0.007
v (nu)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)
0.00000	1.00000	1.0000	1.00000	1.00000
0.01000	1.00010	1.00013	1.00016	1.00027
0.02000	1.00011	1.00017	1.00023	1.00045
0.03000	1.00002	1.00011	1.00021	1.00054
0.04000	0.99983	0.99996	1.00008	1.00053
0.05000	0.99954	0.99971	0.99986	1.00043
0.06000	0.99915	0.99936	0.99955	1.00024
0.07000	0.99867	0.99891	0.99914	0.99996
0.08000	0.99809	0.99836	0.99863	0.99958
0.09000	0.99741	0.99772	0.99802	0.99911
0.10000	0.99663	0.99698	0.99732	0.99855
0.11000	0.99575	0.99615	0.99652	0.99789
0.12000	0.99478	0.99521	0.99563	0.99714
0.13000	0.99370	0.99418	0.99463	0.99630
0.14000	0.99253	0.99304	0.99354	0.99536
0.15000	0.99125	0.99181	0.99235	0.99432
0.16000	0.98987	0.99048	0.99105	0.99319
0.17000	0.98840	0.98904	0.98966	0.99197
0.18000	0.98682	0.98751	0.98817	0.99065
0.19000	0.98513	0.98587	0.98658	0.98923
0.20000	0.98335	0.98413	0.98489	0.98771
0.21000	0.98146	0.98229	0.98310	0.98610
0.22000	0.97947	0.98035	0.98120	0.98439
0.23000	0.97737	0.97830	0.97920	0.98258
0.24000	0.97517	0.97615	0.97710	0.98067
0.25000	0.97286	0.97389	0.97489	0.97865
0.26000	0.97044	0.97152	0.97257	0.97654
0.27000	0.96792	0.96905	0.97015	0.97433
0.28000	0.96529	0.96647	0.96762	0.97201
0.29000	0.96254	0.96378	0.96499	0.96958
0.30000	0.95969	0.96098	0.96224	0.96706
0.31000	0.95672	0.95807	0.95939	0.96442
0.32000	0.95364	0.95505	0.95642	0.96168
0.33000	0.95044	0.95191	0.95334	0.95883
0.34000	0.94713	0.94866	0.95015	0.95587
0.35000	0.94371	0.94529	0.94684	0.95281
0.36000	0.94016	0.94180	0.94341	0.94962
0.37000	0.93650	0.93820	0.93987	0.94633
0.38000	0.93271	0.93447	0.93621	0.94292
0.39000	0.92880	0.93063	0.93243	0.93940
0.40000	0.92476	0.92666	0.92852	0.93575

0.41000	0.92060	0.92256	0.92449	0.93199
0.42000	0.91631	0.91834	0.92033	0.92810
0.43000	0.91189	0.91399	0.91605	0.92410
0.44000	0.90734	0.90950	0.91163	0.91996
0.45000	0.90265	0.90489	0.90709	0.91570
0.46000	0.89783	0.90013	0.90240	0.91132
0.47000	0.89287	0.89524	0.89759	0.90680
0.48000	0.88777	0.89021	0.89263	0.90214
0.49000	0.88252	0.88504	0.88753	0.89735

	K1=0.008 K2=0.008	K1=0.009 K2=0.009	K1=0.01 K2=0.01	
v (nu)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)	w(ANSYS)/w(Ansys 0)
0.00000	1.00000	1.00000	1.00000	
0.01000	1.00022	1.00025	1.00027	
0.02000	1.00035	1.00040	1.00045	
0.03000	1.00038	1.00046	1.00054	
0.04000	1.00032	1.00043	1.00053	
0.05000	1.00016	1.00030	1.00043	
0.06000	0.99991	1.00008	1.00024	
0.07000	0.99956	0.99976	0.99996	
0.08000	0.99912	0.99936	0.99958	
0.09000	0.99859	0.99885	0.99911	
0.10000	0.99796	0.99826	0.99855	
0.11000	0.99723	0.99757	0.99789	
0.12000	0.99641	0.99678	0.99714	
0.13000	0.99549	0.99590	0.99630	
0.14000	0.99448	0.99492	0.99536	
0.15000	0.99337	0.99385	0.99432	
0.16000	0.99216	0.99268	0.99319	
0.17000	0.99085	0.99142	0.99197	
0.18000	0.98945	0.99005	0.99065	
0.19000	0.98794	0.98859	0.98923	
0.20000	0.98634	0.98704	0.98771	
0.21000	0.98464	0.98538	0.98610	
0.22000	0.98283	0.98362	0.98439	
0.23000	0.98093	0.98176	0.98258	
0.24000	0.97892	0.97980	0.98067	
0.25000	0.97681	0.97774	0.97865	
0.26000	0.97460	0.97558	0.97654	
0.27000	0.97228	0.97331	0.97433	
0.28000	0.96986	0.97094	0.97201	
0.29000	0.96733	0.96847	0.96958	
0.30000	0.96469	0.96588	0.96706	
0.31000	0.96195	0.96320	0.96442	
0.32000	0.95909	0.96040	0.96168	
0.33000	0.95613	0.95749	0.95883	
0.34000	0.95305	0.95447	0.95587	
0.35000	0.94986	0.95134	0.95281	

0.36000	0.94656	0.94810	0.94962	
0.37000	0.94314	0.94475	0.94633	
0.38000	0.93960	0.94127	0.94292	
0.39000	0.93595	0.93768	0.93940	
0.40000	0.93217	0.93397	0.93575	
0.41000	0.92828	0.93014	0.93199	
0.42000	0.92425	0.92619	0.92810	
0.43000	0.92011	0.92211	0.92410	
0.44000	0.91583	0.91791	0.91996	
0.45000	0.91143	0.91357	0.91570	
0.46000	0.90689	0.90911	0.91132	
0.47000	0.90222	0.90451	0.90680	
0.48000	0.89741	0.89978	0.90214	
0.49000	0.89246	0.89491	0.89735	

Er valt nu iets vreemds op. Zoals hierboven is uitgelegd, als nu=0 is, moet de verhouding van w (ANSYS)/ w (ANSYS 0) gelijk aan 1 zijn. Vanaf de krommingen 0.0005 tot 0.002 gebeurt dat werkelijk ook. Bij krommingen groter dan 0.002 (dus 0.002 tot 0.01) gebeurt er iets opmerkelijks. Bij een grotere dwarscontractie wordt de verplaatsing onder de puntlast eerst groter ondanks het feit dat de dwarscontractie steeds groter gekozen wordt en dan wordt het weer kleiner. Dat zien we in de tabellen omdat de verhouding w(ANSYS)/ w(ANSYS 0) eerst groter dan 1 wordt maar daarna weer kleiner wordt. Dit zou ook kunnen betekenen dat er een verband bestaat tussen de krommingen en de poisson ratio. Echter, deze verband is erg klein. Bovendien als men deze verband ook in de formule zou opnemen, zou dat leiden tot een hele ingewikkelde formule. Maar vooral omdat de invloed erg klein is, wordt dat hier verder verwaarloosd.
De simpelste formule die deze gegevens goed vertegenwoordigd is:
$C(v)= 1-0.5*v^2$
De functie is in de volgende figuur in zwart aangegeven.
Deze functie geeft in de extreme gevallen een fout van 1%. (bovengrens).


1.00
0.98
0.96
0.94
0.92
0.90
0.88
0
0.1
0.2
0.3
0.4
0.5
v
0.0005
0.001
0.0006
0.003
0.006
0.01
$\sqrt{1-v^2}$
$1-0.5\,v^2$

Bijlage 8: Fouten van de koepelformule ten opzichte van de waarde van ANSYS bij g-(1/k)

P	E	k1	k2	t	v	w (Ansys)	w(formule)	Residual	%Error
1000	1000	0.0005	0.0005	1	0	868.16352	869.636	-1.47248	-0.169608601
1000	1000	0.0005	0.0005	20	0.4	2.0732	2.0001628	0.0730372	3.522921088
1000	1000	0.0006	0.0005	1	0	792.72954	793.86542	-1.13588336	-0.143287629
1000	1000	0.0007	0.0005	1	0	734.08976	734.97657	-0.88680547	-0.12080341
1000	1000	0.0008	0.0005	1	0	686.81309	687.50762	-0.69453382	-0.101124138
1000	1000	0.0009	0.0005	1	0	647.64657	648.1884	-0.54183389	-0.083661972
1000	1000	0.001	0.0005	1	0	614.50737	614.92551	-0.41814276	-0.068045199
1000	1000	0.002	0.0005	1	0	434.91543	434.818	0.09743	0.022402056
1000	1000	0.003	0.0005	1	0	355.169	355.02741	0.141589674	0.039865437
1000	1000	0.004	0.0005	1	0	307.50525	307.46276	0.042493618	0.013818827
1000	1000	0.005	0.0005	1	0	274.88951	275.00305	-0.11353953	-0.041303696
1000	1000	0.006	0.0005	1	0	250.75003	251.04229	-0.29225935	-0.116554063
1000	1000	0.007	0.0005	1	0	231.94257	232.42	-0.47742737	-0.205838614
1000	1000	0.008	0.0005	1	0	216.74823	217.409	-0.66077	-0.304856007
1000	1000	0.009	0.0005	1	0	204.13711	204.97517	-0.83806092	-0.410538251
1000	1000	0.01	0.0005	1	0	193.44923	194.45652	-1.00729117	-0.520700531
1000	1000	0.01	0.0005	4	0.4	11.36884	11.18125	0.18759003	1.650036679
1000	1000	0.0006	0.0006	1	0	723.78076	724.69667	-0.91590667	-0.126544766
1000	1000	0.0007	0.0006	1	0	670.26613	670.93874	-0.67261024	-0.100349728
1000	1000	0.0008	0.0006	1	0	627.11994	627.60572	-0.48578337	-0.077462594
1000	1000	0.0009	0.0006	1	0	591.37483	591.71235	-0.33752054	-0.057073877
1000	1000	0.001	0.0006	1	0	561.13049	561.34762	-0.21713421	-0.03869585
1000	1000	0.002	0.0006	1	0	397.23947	396.93271	0.306758318	0.077222517
1000	1000	0.003	0.0006	1	0	324.48395	324.0942	0.389748053	0.120113199
1000	1000	0.004	0.0006	1	0	281.00986	280.67381	0.336047895	0.119585802
1000	1000	0.005	0.0006	1	0	251.26751	251.04229	0.225220652	0.089633814
1000	1000	0.006	0.0006	1	0	229.25818	229.16921	0.08897206	0.038808674
1000	1000	0.007	0.0006	1	0	212.11205	212.16946	-0.05740896	-0.027065393
1000	1000	0.008	0.0006	1	0	198.26052	198.46636	-0.20583584	-0.103820892
1000	1000	0.009	0.0006	1	0	186.76397	187.11587	-0.35190474	-0.188422176
1000	1000	0.01	0.0006	1	0	177.02047	177.51371	-0.49323516	-0.27863171
1000	1000	0.0007	0.0007	1	0	620.54524	621.16857	-0.62333143	-0.10044899
1000	1000	0.0008	0.0007	1	0	580.61159	581.04999	-0.43840343	-0.075507178

1000	1000	0.0009	0.0007	1	0	547.52693	547.81919	-0.29225742	-0.053377725
1000	1000	0.001	0.0007	1	0	519.62937	519.70691	-0.07754345	-0.014922839
1000	1000	0.002	0.0007	1	0	367.93743	367.48828	0.449147267	0.122071643
1000	1000	0.003	0.0007	1	0	300.60965	300.05293	0.556723618	0.185198186
1000	1000	0.004	0.0007	1	0	260.38685	259.85346	0.533393273	0.204846471
1000	1000	0.005	0.0007	1	0	232.87359	232.42	0.453592628	0.194780623
1000	1000	0.006	0.0007	1	0	212.51653	212.16946	0.34707104	0.163314844
1000	1000	0.007	0.0007	1	0	196.65903	196.43075	0.228280337	0.116079255
1000	1000	0.008	0.0007	1	0	183.84917	183.74414	0.105028634	0.057127608
1000	1000	0.009	0.0007	1	0	173.21737	173.23564	-0.01826782	-0.010546181
1000	1000	0.01	0.0007	1	0	164.20667	164.34576	-0.13908622	-0.084701934
1000	1000	0.0008	0.0008	1	0	543.14258	543.5225	-0.37992	-0.069948484
1000	1000	0.0009	0.0008	1	0	512.20575	512.43793	-0.2321773	-0.045328914
1000	1000	0.001	0.0008	1	0	486.11729	486.1413	-0.02401292	-0.004939738
1000	1000	0.002	0.0008	1	0	344.24472	343.75381	0.49090809	0.142604392
1000	1000	0.003	0.0008	1	0	281.26966	280.67381	0.595847895	0.211842221
1000	1000	0.004	0.0008	1	0	243.64643	243.07065	0.57577854	0.236317249
1000	1000	0.005	0.0008	1	0	217.91057	217.409	0.50157	0.230172405
1000	1000	0.006	0.0008	1	0	198.86765	198.46636	0.401294159	0.201789562
1000	1000	0.007	0.0008	1	0	184.0327	183.74414	0.288558634	0.156797479
1000	1000	0.008	0.0008	1	0	172.04762	171.87691	0.170714045	0.09922488
1000	1000	0.009	0.0008	1	0	162.09909	162.0471	0.051989027	0.032072374
1000	1000	0.01	0.0008	1	0	153.66624	153.73138	-0.06513819	-0.042389396
1000	1000	0.0009	0.0009	1	0	482.97804	483.13111	-0.15307111	-0.031693182
1000	1000	0.001	0.0009	1	0	458.45548	458.33842	0.11706412	0.025534458
1000	1000	0.002	0.0009	1	0	324.73559	324.0942	0.641388053	0.197510859
1000	1000	0.003	0.0009	1	0	265.3962	264.62181	0.774392212	0.291787227
1000	1000	0.004	0.0009	1	0	229.95672	229.16921	0.78751206	0.34246099
1000	1000	0.005	0.0009	1	0	205.72223	204.97517	0.747059079	0.363139695
1000	1000	0.006	0.0009	1	0	187.7954	187.11587	0.679525263	0.361843401
1000	1000	0.007	0.0009	1	0	173.83354	173.23564	0.597902182	0.34395099
1000	1000	0.008	0.0009	1	0	162.55641	162.0471	0.509309027	0.313312177
1000	1000	0.009	0.0009	1	0	153.19742	152.77947	0.41794804	0.272816631
1000	1000	0.01	0.0009	1	0	145.26569	144.93933	0.326356667	0.224661905
1000	1000	0.001	0.001	1	0	434.91012	434.818	0.09212	0.021181388
1000	1000	0.001	0.001	10	0.4	4.14518	4.0003256	0.1448544	3.494526173
1000	1000	0.001	0.001	0.5	0.4	1592.9838	1600.1302	-7.14648	-0.448622276
1000	1000	0.002	0.001	1	0	308.08044	307.46276	0.617683618	0.200494266

1000	1000	0.003	0.001	1	0	251.80166	251.04229	0.759370652	0.301574919
1000	1000	0.004	0.001	1	0	218.19499	217.409	0.78599	0.36022367
1000	1000	0.005	0.001	1	0	195.21722	194.45652	0.760698832	0.389667895
1000	1000	0.005	0.001	2	0.2	48.32102	47.641848	0.67917231	1.405542164
1000	1000	0.005	0.001	0.3	0.4	2850.5118	2862.4	-11.888153	-0.417053276
1000	1000	0.005	0.001	4.4	0.4	9.59945	9.2407025	0.358747546	3.737167713
1000	1000	0.006	0.001	1	0	178.22225	177.51371	0.708544837	0.397562502
1000	1000	0.007	0.001	1	0	164.98764	164.34576	0.641883775	0.389049613
1000	1000	0.008	0.001	1	0	154.29893	153.73138	0.567551809	0.367826147
1000	1000	0.009	0.001	1	0	145.42892	144.93933	0.489586667	0.336650143
1000	1000	0.01	0.001	1	0	137.91202	137.50152	0.410495236	0.297650079
1000	1000	0.002	0.002	1	0	218.24374	217.409	0.83474	0.382480615
1000	1000	0.003	0.002	1	0	178.53754	177.51371	1.023834837	0.573456337
1000	1000	0.004	0.002	1	0	154.8309	153.73138	1.099521809	0.710143653
1000	1000	0.005	0.002	1	0	138.63057	137.50152	1.129045236	0.81442732
1000	1000	0.006	0.002	1	0	126.65518	125.52114	1.134035326	0.895372243
1000	1000	0.007	0.002	1	0	117.33427	116.21	1.124271314	0.95817813
1000	1000	0.008	0.002	1	0	109.80958	108.7045	1.10508	1.006360283
1000	1000	0.009	0.002	1	0	103.56728	102.48759	1.079694539	1.042505451
1000	1000	0.01	0.002	1	0	98.2785	97.228261	1.050239416	1.068635984
1000	1000	0.003	0.003	1	0	145.9707	144.93933	1.031366667	0.706557321
1000	1000	0.004	0.003	1	0	126.65812	125.52114	1.136975326	0.897672669
1000	1000	0.005	0.003	1	0	113.45643	112.26952	1.186905158	1.046133003
1000	1000	0.006	0.003	1	0	103.69806	102.48759	1.210474539	1.167306832
1000	1000	0.007	0.003	1	0	96.10403	94.885067	1.218963403	1.268379071
1000	1000	0.008	0.003	1	0	89.9747	88.756853	1.217847419	1.353544295
1000	1000	0.009	0.003	1	0	84.89098	83.680763	1.210216884	1.425613044
1000	1000	0.01	0.003	1	0	80.58456	79.386542	1.198017664	1.486659062
1000	1000	0.004	0.004	1	0	109.81509	108.7045	1.11059	1.011327314
1000	1000	0.005	0.004	1	0	98.40972	97.228261	1.181459416	1.200551547
1000	1000	0.006	0.004	1	0	89.9757	88.756853	1.218847419	1.354640662
1000	1000	0.007	0.004	1	0	83.41154	82.172878	1.238661888	1.485000622
1000	1000	0.008	0.004	1	0	78.11355	76.865689	1.247860905	1.597496087
1000	1000	0.009	0.004	1	0	73.71971	72.469667	1.250043333	1.695670443
1000	1000	0.01	0.004	1	0	69.99808	68.750762	1.247317618	1.781931187
1000	1000	0.005	0.005	1	0	88.11737	86.9636	1.15377	1.309355919
1000	1000	0.006	0.005	1	0	80.59239	79.386542	1.205847664	1.496230182

1000	1000	0.007	0.005	1	0	74.73348	73.497657	1.235823453	1.653640983
1000	1000	0.008	0.005	1	0	70.00399	68.750762	1.253227618	1.790223126
1000	1000	0.009	0.005	1	0	66.08153	64.81884	1.262689611	1.910805653
1000	1000	0.01	0.005	1	0	62.75929	61.492551	1.266738724	2.018408308
1000	1000	0.006	0.006	1	0	73.63299	72.469667	1.163323333	1.579894193
1000	1000	0.007	0.006	1	0	68.29835	67.093874	1.204475976	1.763550622
1000	1000	0.008	0.006	1	0	63.99016	62.760572	1.229587663	1.921526158
1000	1000	0.009	0.006	1	0	60.41623	59.171235	1.244994946	2.060696183
1000	1000	0.01	0.006	1	0	57.38881	56.134762	1.254047579	2.185177875
1000	1000	0.007	0.007	1	0	63.29393	62.116857	1.177072857	1.859693113
1000	1000	0.008	0.007	1	0	59.31551	58.104999	1.210510657	2.040799543
1000	1000	0.009	0.007	1	0	56.01387	54.781919	1.231951258	2.199368225
1000	1000	0.01	0.007	1	0	53.21647	51.970691	1.245778655	2.34096447
1000	1000	0.008	0.008	1	0	55.52898	54.35225	1.17673	2.119127706
1000	1000	0.009	0.008	1	0	52.44874	51.243793	1.20494727	2.297380775
1000	1000	0.01	0.008	1	0	49.83785	48.61413	1.223719708	2.455402286
1000	1000	0.009	0.009	1	0	49.48451	48.313111	1.171398889	2.367203169
1000	1000	0.01	0.009	1	0	47.02967	45.833842	1.195828412	2.542710617
1000	1000	0.01	0.01	1	0	44.65029	43.4818	1.16849	2.616981883
1000	1000	0.01	0.01	1	0.4	41.52756	40.003256	1.524304	3.670584065
1000	1000	0.01	0.01	0.1	0.4	15925.616	16001.302	-75.6866	-0.475250696
1000	1000	0.01	0.01	0.1	0.4	3992.4673	4000.3256	-7.85832	-0.196828664

Bijlage 9: Fouten van de koepelformule ten opzichte van de waarde van ANSYS bij g-(1/2k)

P	E	k1	k2	t	v	w (Ansys)	w(formule)	Residual	%Error
1000	1000	0.0005	0.0005	20	0.4	2.02652	2.0001628	0.0263572	1.30061386
1000	1000	0.0005	0.0005	1	0	867.32563	869.636	-2.31037	-0.2663786
1000	1000	0.0005	0.0005	1	0.4	795.72959	800.06512	-4.33553	-0.5448497
1000	1000	0.0006	0.0005	1	0	791.95955	793.86542	-1.90587336	-0.2406529
1000	1000	0.0007	0.0005	1	0	733.34691	734.97657	-1.62965547	-0.2222216
1000	1000	0.0008	0.0005	1	0	686.07485	687.50762	-1.43277382	-0.2088364
1000	1000	0.0009	0.0005	1	0	646.89907	648.1884	-1.28933389	-0.1993099
1000	1000	0.001	0.0005	1	0	613.74154	614.92551	-1.18397276	-0.1929106
1000	1000	0.001	0.0005	6.5	0.4	13.51913	13.390094	0.129036	0.9544697
1000	1000	0.001	0.0005	0.8	0.4	879.8452	883.95542	-4.1102246	-0.4671532
1000	1000	0.002	0.0005	1	0	433.92412	434.818	-0.89388	-0.2059992
1000	1000	0.003	0.0005	1	0	353.86287	355.02741	-1.16454033	-0.3290937
1000	1000	0.004	0.0005	1	0	305.92079	307.46276	-1.54196638	-0.5040411
1000	1000	0.005	0.0005	6	0.4	7.01169	7.0278557	-0.01616571	-0.2305537
1000	1000	0.005	0.0005	0.35	0.4	2049.9567	2065.329	-15.372355	-0.7498868
1000	1000	0.005	0.0005	1	0	273.05709	275.00305	-1.94595953	-0.7126567
1000	1000	0.006	0.0005	1	0	248.6942	251.04229	-2.34808935	-0.9441673
1000	1000	0.007	0.0005	1	0	229.68393	232.42	-2.73606737	-1.1912315
1000	1000	0.008	0.0005	1	0	214.3046	217.409	-3.1044	-1.4485923
1000	1000	0.009	0.0005	1	0	201.52426	204.97517	-3.45091092	-1.7124047
1000	1000	0.01	0.0005	1	0.4	175.72666	178.9	-3.1733395	-1.8058384
1000	1000	0.01	0.0005	4.4	0.4	8.99293	9.2407025	-0.24777245	-2.7551916
1000	1000	0.01	0.0005	1	0	190.68129	194.45652	-3.77523117	-1.9798645
1000	1000	0.0006	0.0006	1	0	722.96227	724.69667	-1.73439667	-0.2399014
1000	1000	0.0007	0.0006	1	0	669.50632	670.93874	-1.43242024	-0.2139517
1000	1000	0.0008	0.0006	1	0	626.38903	627.60572	-1.21669337	-0.1942393
1000	1000	0.0009	0.0006	1	0	590.65504	591.71235	-1.05731054	-0.1790064
1000	1000	0.001	0.0006	1	0	560.41024	561.34762	-0.93738421	-0.1672675
1000	1000	0.002	0.0006	1	0	396.28965	396.93271	-0.64306168	-0.1622706
1000	1000	0.003	0.0006	1	0	323.23663	324.0942	-0.85757195	-0.2653078
1000	1000	0.004	0.0006	1	0	279.49213	280.67381	-1.18168211	-0.4227962
1000	1000	0.005	0.0006	1	0	249.5067	251.04229	-1.53558935	-0.6154501
1000	1000	0.006	0.0006	1	0	227.2773	229.16921	-1.89190794	-0.8324227
1000	1000	0.007	0.0006	1	0	209.93057	212.16946	-2.23888896	-1.0664902
1000	1000	0.008	0.0006	1	0	195.89527	198.46636	-2.57108584	-1.3124798

1000	1000	0.009	0.0006	1	0	184.22977	187.11587	-2.88610474	-1.5665789
1000	1000	0.01	0.0006	4	0.4	10.0069	10.207038	-0.20013805	-2.0000005
1000	1000	0.01	0.0006	1	0	174.33057	177.51371	-3.18313516	-1.8259191
1000	1000	0.0007	0.0007	1	0	619.80751	621.16857	-1.36106143	-0.2195942
1000	1000	0.0008	0.0007	1	0	579.92835	581.04999	-1.12164343	-0.1934107
1000	1000	0.0009	0.0007	1	0	546.87414	547.81919	-0.94504742	-0.1728089
1000	1000	0.001	0.0007	1	0	518.99382	519.70691	-0.71309345	-0.1373992
1000	1000	0.002	0.0007	1	0	367.14287	367.48828	-0.34541273	-0.0940813
1000	1000	0.003	0.0007	1	0	299.57082	300.05293	-0.48210638	-0.1609324
1000	1000	0.004	0.0007	1	0	259.11971	259.85346	-0.73374673	-0.283169
1000	1000	0.005	0.0007	1	0	231.40019	232.42	-1.01980737	-0.4407116
1000	1000	0.006	0.0007	1	0	210.85629	212.16946	-1.31316896	-0.6227791
1000	1000	0.007	0.0007	1	0	194.82853	196.43075	-1.60221966	-0.8223743
1000	1000	0.008	0.0007	1	0	181.86276	183.74414	-1.88138137	-1.0345061
1000	1000	0.009	0.0007	1	0	171.08767	173.23564	-2.14796782	-1.2554779
1000	1000	0.01	0.0007	1	0	161.94495	164.34576	-2.40080622	-1.4824829
1000	1000	0.0008	0.0008	1	0	542.2743	543.5225	-1.2482	-0.2301787
1000	1000	0.0009	0.0008	1	0	511.39233	512.43793	-1.0455973	-0.2044609
1000	1000	0.001	0.0008	1	0	485.51929	486.1413	-0.62201292	-0.1281129
1000	1000	0.002	0.0008	1	0	343.57502	343.75381	-0.17879191	-0.0520387
1000	1000	0.003	0.0008	1	0	280.40949	280.67381	-0.26432211	-0.0942629
1000	1000	0.004	0.0008	1	0	242.59887	243.07065	-0.47178146	-0.1944698
1000	1000	0.005	0.0008	1	0	216.69141	217.409	-0.71759	-0.3311576
1000	1000	0.006	0.0008	1	0	197.49235	198.46636	-0.97400584	-0.4931866
1000	1000	0.007	0.0008	1	0	182.51489	183.74414	-1.22925137	-0.6735074
1000	1000	0.008	0.0008	1	0	170.39925	171.87691	-1.47765595	-0.8671728
1000	1000	0.009	0.0008	1	0	160.33074	162.0471	-1.71636097	-1.0705127
1000	1000	0.01	0.0008	1	0	151.78736	153.73138	-1.94401819	-1.280751
1000	1000	0.0009	0.0009	1	0	482.39801	483.13111	-0.73310111	-0.1519702
1000	1000	0.001	0.0009	1	0	457.76373	458.33842	-0.57468588	-0.125542
1000	1000	0.002	0.0009	1	0	324.03535	324.0942	-0.05885195	-0.0181622
1000	1000	0.003	0.0009	1	0	264.52053	264.62181	-0.10127779	-0.0382873
1000	1000	0.004	0.0009	1	0	228.89596	229.16921	-0.27324794	-0.1193765
1000	1000	0.005	0.0009	1	0	204.4878	204.97517	-0.48737092	-0.2383374
1000	1000	0.006	0.0009	1	0	186.40102	187.11587	-0.71485474	-0.3835037
1000	1000	0.007	0.0009	1	0	172.29204	173.23564	-0.94359782	-0.5476735
1000	1000	0.008	0.0009	1	0	160.8793	162.0471	-1.16780097	-0.7258864
1000	1000	0.009	0.0009	1	0	151.395	152.77947	-1.38447196	-0.9144767

1000	1000	0.01	0.0009	1	0	143.34724	144.93933	-1.59209333	-1.110655
1000	1000	0.001	0.001	1	0	434.2641	434.818	-0.5539	-0.1275491
1000	1000	0.001	0.001	10	0.4	4.05491	4.0003256	0.0545844	1.34613099
1000	1000	0.001	0.001	0.5	0.4	1591.3097	1600.1302	-8.82055	-0.554295
1000	1000	0.002	0.001	1	0	307.49716	307.46276	0.034403618	0.01118827
1000	1000	0.003	0.001	1	0	251.07379	251.04229	0.031500652	0.01254637
1000	1000	0.004	0.001	1	0	217.30028	217.409	-0.10872	-0.0500321
1000	1000	0.005	0.001	1	0	194.16153	194.45652	-0.29499117	-0.1519308
1000	1000	0.005	0.001	0.25	0.4	2846.458	2862.4	-15.941953	-0.5600628
1000	1000	0.005	0.001	4.6	0.4	8.5938	8.4546314	0.13916864	1.61940748
1000	1000	0.006	0.001	1	0	177.01644	177.51371	-0.49726516	-0.2809147
1000	1000	0.007	0.001	1	0	163.64276	164.34576	-0.70299622	-0.429592
1000	1000	0.008	0.001	1	0	152.82523	153.73138	-0.90614819	-0.592931
1000	1000	0.009	0.001	1	0	143.83573	144.93933	-1.10360333	-0.7672665
1000	1000	0.01	0.001	1	0	136.20781	137.50152	-1.29371476	-0.9498095
1000	1000	0.002	0.002	1	0	217.57633	217.409	0.16733	0.07690634
1000	1000	0.003	0.002	1	0	177.96362	177.51371	0.449914837	0.25281281
1000	1000	0.004	0.002	1	0	154.23227	153.73138	0.500891809	0.3247646
1000	1000	0.005	0.002	1	0	137.9698	137.50152	0.468275236	0.33940416
1000	1000	0.006	0.002	1	0	125.91873	125.52114	0.397585326	0.31574757
1000	1000	0.007	0.002	1	0	116.51827	116.21	0.308271314	0.26456908
1000	1000	0.008	0.002	1	0	108.91441	108.7045	0.20991	0.19272932
1000	1000	0.009	0.002	1	0	102.59523	102.48759	0.107644539	0.10492158
1000	1000	0.01	0.002	1	0	97.23266	97.228261	0.004399416	0.00452463
1000	1000	0.003	0.003	1	0	145.31406	144.93933	0.374726667	0.25787365
1000	1000	0.004	0.003	1	0	126.08528	125.52114	0.564135326	0.44742362
1000	1000	0.005	0.003	1	0	112.89078	112.26952	0.621255158	0.55031523
1000	1000	0.006	0.003	1	0	103.10771	102.48759	0.620124539	0.60143372
1000	1000	0.007	0.003	1	0	95.47341	94.885067	0.588343403	0.61623797
1000	1000	0.008	0.003	1	0	89.29607	88.756853	0.539217419	0.60385347
1000	1000	0.009	0.003	1	0	84.16085	83.680763	0.480086884	0.57043968
1000	1000	0.01	0.003	1	0	79.80183	79.386542	0.415287664	0.52039867
1000	1000	0.004	0.004	1	0	109.18563	108.7045	0.48113	0.44065323
1000	1000	0.005	0.004	1	0	97.85053	97.228261	0.622269416	0.63593873
1000	1000	0.006	0.004	1	0	89.43525	88.756853	0.678397419	0.75853471
1000	1000	0.007	0.004	1	0	82.86488	82.172878	0.692001888	0.83509671
1000	1000	0.008	0.004	1	0	77.54685	76.865689	0.681160905	0.8783863

1000	1000	0.009	0.004	1	0	73.12491	72.469667	0.655243333	0.89606036
1000	1000	0.01	0.004	1	0	69.3705	68.750762	0.619737618	0.89337343
1000	1000	0.005	0.005	1	0	87.4809	86.9636	0.5173	0.59132908
1000	1000	0.006	0.005	1	0	80.01943	79.386542	0.632887664	0.79091749
1000	1000	0.007	0.005	1	0	74.18514	73.497657	0.687483453	0.92671316
1000	1000	0.008	0.005	1	0	69.45941	68.750762	0.708647618	1.02023271
1000	1000	0.009	0.005	1	0	65.52822	64.81884	0.709379611	1.0825559
1000	1000	0.01	0.005	1	0	62.18936	61.492551	0.696808724	1.12046293
1000	1000	0.006	0.006	1	0	72.97031	72.469667	0.500643333	0.68609183
1000	1000	0.007	0.006	1	0	67.69462	67.093874	0.600745976	0.88743533
1000	1000	0.008	0.006	1	0	63.41442	62.760572	0.653847663	1.03107095
1000	1000	0.009	0.006	1	0	59.85047	59.171235	0.679234946	1.13488657
1000	1000	0.01	0.006	1	0	56.82162	56.134762	0.686857579	1.20879619
1000	1000	0.007	0.007	1	0	62.65317	62.116857	0.536312857	0.85600275
1000	1000	0.007	0.007	1.3	0.4	34.22608	33.815094	0.41098617	1.20079825
1000	1000	0.007	0.007	0.07	0.4	11598.327	11662.757	-64.42937	-0.5555057
1000	1000	0.008	0.007	1	0	58.72529	58.104999	0.620290657	1.05625814
1000	1000	0.009	0.007	1	0	55.45077	54.781919	0.668851258	1.20620734
1000	1000	0.01	0.007	0.07	0.4	9711.2494	9757.7625	-46.513061	-0.4789606
1000	1000	0.01	0.007	1.1	0.4	40.25558	39.514906	0.74067418	1.83992922
1000	1000	0.01	0.007	1	0	52.66597	51.970691	0.695278655	1.32016681
1000	1000	0.01	0.007	1.2	0.4	33.87962	33.203497	0.67612275	1.99566214
1000	1000	0.01	0.007	0.06	0.4	13212.971	13281.399	-68.4275	-0.5178812
1000	1000	0.008	0.008	1	0	54.87941	54.35225	0.52716	0.96057884
1000	1000	0.009	0.008	1	0	51.84509	51.243793	0.60129727	1.15979598
1000	1000	0.01	0.008	1	0	49.26115	48.61413	0.647019708	1.31344824
1000	1000	0.009	0.009	1	0	48.83784	48.313111	0.524728889	1.07443099
1000	1000	0.01	0.009	1	0	46.42429	45.833842	0.590448412	1.27185233
1000	1000	0.01	0.01	1	0	44.014	43.4818	0.5322	1.20916072
1000	1000	0.01	0.01	1	0.4	40.54676	40.003256	0.543504	1.34043756
1000	1000	0.01	0.01	0.05	0.4	15913.097	16001.302	-88.20549	-0.5542949

Bijlage 10: Fouten van de koepelformule ten opzichte van de waarde van ANSYS bij g-(1/4k)

P	E	k1	k2	t	v	w (Ansys)	w(formule)	residual	Error %
1000	1000	0.0005	0.0005	1	0	865.35075	869.636	-4.28525	-0.495204
1000	1000	0.0005	0.0005	20	0.4	1.74775	2.0001628	-0.252413	-14.44216
1000	1000	0.0006	0.0005	1	0	790.25268	793.86542	-3.612743	-0.457163
1000	1000	0.0007	0.0005	1	0	731.76231	734.97657	-3.214255	-0.439249
1000	1000	0.0008	0.0005	1	0	684.53397	687.50762	-2.973654	-0.434406
1000	1000	0.0009	0.0005	1	0	645.35367	648.1884	-2.834734	-0.439253
1000	1000	0.001	0.0005	1	0	612.15964	614.92551	-2.765873	-0.451822
1000	1000	0.002	0.0005	1	0	431.3145	434.818	-3.5035	-0.812284
1000	1000	0.003	0.0005	1	0	350.27004	355.02741	-4.75737	-1.358201
1000	1000	0.004	0.0005	1	0	301.51481	307.46276	-5.947946	-1.972688
1000	1000	0.005	0.0005	1	0	267.98649	275.00305	-7.01656	-2.618251
1000	1000	0.006	0.0005	1	0	243.07724	251.04229	-7.965049	-3.276757
1000	1000	0.007	0.0005	1	0	223.61475	232.42	-8.805247	-3.937686
1000	1000	0.008	0.0005	1	0	207.85899	217.409	-9.55001	-4.594466
1000	1000	0.009	0.0005	1	0	194.76393	204.97517	-10.21124	-5.242881
1000	1000	0.01	0.0005	0.3	0.4	1936.05182	1987.7778	-51.72595	-2.671724
1000	1000	0.01	0.0005	4.4	0.4	8.15657	9.2407025	-1.084132	-13.29152
1000	1000	0.01	0.0005	1	0	183.65704	194.45652	-10.79948	-5.880244
1000	1000	0.0006	0.0006	1	0	720.87295	724.69667	-3.823717	-0.530429
1000	1000	0.0007	0.0006	1	0	667.66203	670.93874	-3.27671	-0.490774
1000	1000	0.0008	0.0006	1	0	624.67179	627.60572	-2.933933	-0.469676
1000	1000	0.0009	0.0006	1	0	588.99644	591.71235	-2.715911	-0.461108
1000	1000	0.001	0.0006	1	0	558.76642	561.34762	-2.581204	-0.461947
1000	1000	0.002	0.0006	1	0	393.98226	396.93271	-2.950452	-0.748879
1000	1000	0.003	0.0006	1	0	320.05749	324.0942	-4.036712	-1.261246
1000	1000	0.004	0.0006	1	0	275.55857	280.67381	-5.115242	-1.856318
1000	1000	0.005	0.0006	1	0	244.94643	251.04229	-6.095859	-2.48865
1000	1000	0.006	0.0006	1	0	222.19767	229.16921	-6.971538	-3.137539
1000	1000	0.007	0.0006	1	0	204.41896	212.16946	-7.750499	-3.791478
1000	1000	0.008	0.0006	1	0	190.02279	198.46636	-8.443566	-4.443449
1000	1000	0.009	0.0006	1	0	178.05474	187.11587	-9.061135	-5.08896
1000	1000	0.01	0.0006	1	0	167.90116	177.51371	-9.612545	-5.725121
1000	1000	0.0007	0.0007	1	0	617.79352	621.16857	-3.375051	-0.546307

1000	1000	0.0008	0.0007	1	0	578.12581	581.04999	-2.924183	-0.505804
1000	1000	0.0009	0.0007	1	0	545.19239	547.81919	-2.626797	-0.481811
1000	1000	0.001	0.0007	1	0	517.27908	519.70691	-2.427833	-0.469347
1000	1000	0.002	0.0007	1	0	365.08376	367.48828	-2.404523	-0.658622
1000	1000	0.003	0.0007	1	0	296.77666	300.05293	-3.276266	-1.10395
1000	1000	0.004	0.0007	1	0	255.64585	259.85346	-4.207607	-1.645873
1000	1000	0.005	0.0007	1	0	227.3458	232.42	-5.074197	-2.231929
1000	1000	0.006	0.0007	1	0	206.31247	212.16946	-5.856989	-2.838892
1000	1000	0.007	0.0007	1	0	189.87215	196.43075	-6.5586	-3.454219
1000	1000	0.008	0.0007	1	0	176.55762	183.74414	-7.186521	-4.070355
1000	1000	0.009	0.0007	1	0	165.48675	173.23564	-7.748888	-4.682482
1000	1000	0.01	0.0007	1	0	156.09242	164.34576	-8.253336	-5.287468
1000	1000	0.0008	0.0008	1	0	540.44836	543.5225	-3.07414	-0.568813
1000	1000	0.0009	0.0008	1	0	509.74923	512.43793	-2.688697	-0.527455
1000	1000	0.001	0.0008	1	0	483.71721	486.1413	-2.424093	-0.501138
1000	1000	0.002	0.0008	1	0	341.69691	343.75381	-2.056902	-0.601967
1000	1000	0.003	0.0008	1	0	277.92151	280.67381	-2.752302	-0.990316
1000	1000	0.004	0.0008	1	0	239.50118	243.07065	-3.569471	-1.490377
1000	1000	0.005	0.0008	1	0	213.0584	217.409	-4.3506	-2.041975
1000	1000	0.006	0.0008	1	0	193.40163	198.46636	-5.064726	-2.618761
1000	1000	0.007	0.0008	1	0	178.03486	183.74414	-5.709281	-3.206833
1000	1000	0.008	0.0008	1	0	165.58793	171.87691	-6.288976	-3.797968
1000	1000	0.009	0.0008	1	0	155.2369	162.0471	-6.810201	-4.386973
1000	1000	0.01	0.0008	1	0	146.45205	153.73138	-7.279328	-4.970452
1000	1000	0.0009	0.0009	1	0	480.18053	483.13111	-2.950581	-0.614473
1000	1000	0.001	0.0009	1	0	455.82515	458.33842	-2.513266	-0.551366
1000	1000	0.002	0.0009	1	0	322.26921	324.0942	-1.824992	-0.566294
1000	1000	0.003	0.0009	1	0	262.24452	264.62181	-2.377288	-0.906516
1000	1000	0.004	0.0009	1	0	226.06091	229.16921	-3.108298	-1.374982
1000	1000	0.005	0.0009	1	0	201.1477	204.97517	-3.827471	-1.902816
1000	1000	0.006	0.0009	1	0	182.62382	187.11587	-4.492055	-2.459731
1000	1000	0.007	0.0009	1	0	168.14079	173.23564	-5.094848	-3.030108
1000	1000	0.008	0.0009	1	0	156.4087	162.0471	-5.638401	-3.604915
1000	1000	0.009	0.0009	1	0	146.65157	152.77947	-6.127902	-4.178545
1000	1000	0.01	0.0009	1	0	138.37036	144.93933	-6.568973	-4.747385
1000	1000	0.001	0.001	1	0	432.16538	434.818	-2.65262	-0.613797
1000	1000	0.001	0.001	10	0.4	3.49635	4.0003256	-0.503976	-14.41433
1000	1000	0.001	0.001	0.5	0.4	1585.35861	1600.1302	-14.77163	-0.931753

1000	1000	0.002	0.001	1	0	305.8164	307.46276	-1.646356	-0.538348
1000	1000	0.003	0.001	1	0	248.99445	251.04229	-2.047839	-0.822444
1000	1000	0.004	0.001	1	0	214.72628	217.409	-2.68272	-1.249367
1000	1000	0.005	0.001	1	0	191.12285	194.45652	-3.333671	-1.744256
1000	1000	0.006	0.001	1	0	173.56799	177.51371	-3.945715	-2.273297
1000	1000	0.007	0.001	1	0	159.83966	164.34576	-4.506096	-2.819135
1000	1000	0.008	0.001	1	0	148.71688	153.73138	-5.014498	-3.371842
1000	1000	0.009	0.001	1	0	139.46493	144.93933	-5.474403	-3.92529
1000	1000	0.01	0.001	1	0	131.61122	137.50152	-5.890305	-4.475534
1000	1000	0.01	0.001	0.2	0	3113.14157	3162.5351	-49.3935	-1.586613
1000	1000	0.002	0.002	1	0	215.44157	217.409	-1.96743	-0.913208
1000	1000	0.003	0.002	1	0	176.27204	177.51371	-1.241665	-0.704403
1000	1000	0.004	0.002	1	0	152.52384	153.73138	-1.207538	-0.791705
1000	1000	0.005	0.002	1	0	136.10169	137.50152	-1.399835	-1.028521
1000	1000	0.006	0.002	1	0	123.84087	125.52114	-1.680275	-1.356801
1000	1000	0.007	0.002	1	0	114.2205	116.21	-1.989499	-1.741805
1000	1000	0.008	0.002	1	0	106.40469	108.7045	-2.29981	-2.16138
1000	1000	0.009	0.002	1	0	99.88909	102.48759	-2.598495	-2.601381
1000	1000	0.01	0.002	1	0	94.34812	97.228261	-2.880141	-3.052674
1000	1000	0.003	0.003	1	0	143.23483	144.93933	-1.704503	-1.190006
1000	1000	0.004	0.003	1	0	124.36882	125.52114	-1.152325	-0.926538
1000	1000	0.005	0.003	1	0	111.24947	112.26952	-1.020055	-0.916908
1000	1000	0.006	0.003	1	0	101.42808	102.48759	-1.059505	-1.044588
1000	1000	0.007	0.003	1	0	93.70371	94.885067	-1.181357	-1.260736
1000	1000	0.008	0.003	1	0	87.41285	88.756853	-1.344003	-1.537534
1000	1000	0.009	0.003	1	0	82.1555	83.680763	-1.525263	-1.856556
1000	1000	0.01	0.003	1	0	77.67413	79.386542	-1.712412	-2.204611
1000	1000	0.004	0.004	1	0	107.0282	108.7045	-1.6763	-1.566223
1000	1000	0.005	0.004	1	0	96.04528	97.228261	-1.182981	-1.23169
1000	1000	0.006	0.004	1	0	87.7529	88.756853	-1.003953	-1.144068
1000	1000	0.007	0.004	1	0	81.203	82.172878	-0.969878	-1.194387
1000	1000	0.008	0.004	1	0	75.85228	76.865689	-1.013409	-1.33603
1000	1000	0.009	0.004	1	0	71.36942	72.469667	-1.100247	-1.541622
1000	1000	0.01	0.004	1	0	67.53987	68.750762	-1.210892	-1.792856
1000	1000	0.005	0.005	1	0	85.20986	86.9636	-1.75374	-2.058142
1000	1000	0.005	0.005	2	0.4	17.35305	20.001628	-2.648578	-15.2629
1000	1000	0.005	0.005	0.1	0.4	7928.4366	8000.6512	-72.2146	-0.91083

1000	1000	0.006	0.005	1	0	78.11291	79.386542	-1.273632	-1.630502
1000	1000	0.007	0.005	1	0	72.44227	73.497657	-1.055387	-1.456866
1000	1000	0.008	0.005	1	0	67.78512	68.750762	-0.965642	-1.424564
1000	1000	0.009	0.005	1	0	63.86968	64.81884	-0.94916	-1.486089
1000	1000	0.01	0.005	1.4	0.4	27.69317	28.863851	-1.170681	-4.227326
1000	1000	0.01	0.005	0.08	0.4	8773.52615	8839.5542	-66.0281	-0.752583
1000	1000	0.01	0.005	1	0	60.5148	61.492551	-0.977751	-1.615723
1000	1000	0.006	0.006	1	0	70.38357	72.469667	-2.086097	-2.963897
1000	1000	0.007	0.006	1	0	65.51746	67.093874	-1.576414	-2.406098
1000	1000	0.008	0.006	1	0	61.45378	62.760572	-1.306792	-2.126464
1000	1000	0.009	0.006	1	0	58.00895	59.171235	-1.162285	-2.003631
1000	1000	0.01	0.006	1	0	55.04402	56.134762	-1.090742	-1.981582
1000	1000	0.007	0.007	1	0	59.94112	62.116857	-2.175737	-3.629791
1000	1000	0.008	0.007	1	0	56.40868	58.104999	-1.696319	-3.007196
1000	1000	0.009	0.007	1	0	53.36676	54.781919	-1.415159	-2.651761
1000	1000	0.01	0.007	1	0	50.72539	51.970691	-1.245301	-2.454986
1000	1000	0.008	0.008	1	0	51.84656	54.35225	-2.50569	-4.832895
1000	1000	0.009	0.008	1	0	49.21202	51.243793	-2.031773	-4.128611
1000	1000	0.01	0.008	1	0	46.88477	48.61413	-1.72936	-3.688533
1000	1000	0.009	0.009	1	0	45.37383	48.313111	-2.939281	-6.477922
1000	1000	0.01	0.009	1	0	43.35568	45.833842	-2.478162	-5.715887
1000	1000	0.01	0.01	1	0	40.44963	43.4818	-3.03217	-7.496163
1000	1000	0.01	0.01	1	0.4	34.71305	40.003256	-5.290206	-15.23982
1000	1000	0.01	0.01	0.05	0.4	15853.5861	16001.302	-147.7163	-0.931753
1000	1000	0.01	0.01	0.5	0.4	152.14667	160.01302	-7.866354	-5.170244

Bijlage 11: Fouten van de koepelformule ten opzichte van de waarde van ANSYS bij g-(2/k)

P	E	k1	k2	t	v	w (Ansys)	w(formule)	Residual	%Error
1000	1000	0.0005	0.0005	1	0	868.41348	869.636	-1.22252	-0.1407763
1000	1000	0.0005	0.0005	1	0.4	797.92378	800.06512	-2.14134	-0.268364
1000	1000	0.0005	0.0005	20	0.4	2.08519	2.0001628	0.0850272	4.07767158
1000	1000	0.0005	0.0005	20	0	2.23739	2.17409	0.0633	2.82918937
1000	1000	0.0006	0.0005	1	0	792.97891	793.86542	-0.88651336	-0.1117953
1000	1000	0.0007	0.0005	1	0	734.34832	734.97657	-0.62824547	-0.0855514
1000	1000	0.0008	0.0005	1	0	687.08548	687.50762	-0.42214382	-0.0614398
1000	1000	0.0009	0.0005	1	0	647.935	648.1884	-0.25340389	-0.0391095
1000	1000	0.001	0.0005	1	0	614.81281	614.92551	-0.11270276	-0.0183312
1000	1000	0.001	0.0005	10	0.4	5.85995	5.6573147	0.202635284	3.4579695
1000	1000	0.002	0.0005	1	0	435.38273	434.818	0.56473	0.12970887
1000	1000	0.003	0.0005	1	0	355.77163	355.02741	0.744219674	0.20918466
1000	1000	0.004	0.0005	1	0	308.22576	307.46276	0.763003618	0.247547
1000	1000	0.005	0.0005	1	0	275.71564	275.00305	0.712590472	0.25845123
1000	1000	0.005	0.0005	2	0.4	64.05948	63.250701	0.80877859	1.26254317
1000	1000	0.006	0.0005	1	0	251.67245	251.04229	0.630160652	0.25038921
1000	1000	0.007	0.0005	1	0	232.95374	232.42	0.533742628	0.22911958
1000	1000	0.008	0.0005	1	0	217.84172	217.409	0.43272	0.19863964
1000	1000	0.009	0.0005	1	0	205.30725	204.97517	0.332079079	0.16174737
1000	1000	0.01	0.0005	1	0.4	179.41255	178.9	0.5125505	0.28568263
1000	1000	0.01	0.0005	1	0	194.6909	194.45652	0.234378832	0.1203851
1000	1000	0.0006	0.0006	1	0	724.03343	724.69667	-0.66323667	-0.091603
1000	1000	0.0007	0.0006	1	0	670.51711	670.93874	-0.42163024	-0.0628814
1000	1000	0.0008	0.0006	1	0	627.37687	627.60572	-0.22885337	-0.0364778
1000	1000	0.0009	0.0006	1	0	591.64178	591.71235	-0.07057054	-0.0119279
1000	1000	0.001	0.0006	1	0	561.52313	561.34762	0.17550579	0.03125531
1000	1000	0.002	0.0006	1	0	397.765	396.93271	0.832288318	0.20924121
1000	1000	0.003	0.0006	1	0	325.12753	324.0942	1.033328053	0.31782238
1000	1000	0.004	0.0006	1	0	281.75785	280.67381	1.084037895	0.38474097
1000	1000	0.005	0.0006	1	0	252.10978	251.04229	1.067490652	0.42342294
1000	1000	0.006	0.0006	1	0	230.18679	229.16921	1.01758206	0.44206797
1000	1000	0.007	0.0006	1	0	213.12049	212.16946	0.95103104	0.44624102
1000	1000	0.008	0.0006	1	0	199.34323	198.46636	0.876874159	0.43988158
1000	1000	0.009	0.0006	1	0	187.91606	187.11587	0.800185263	0.42582058
1000	1000	0.01	0.0006	1	0	178.23753	177.51371	0.723824837	0.40610125

1000	1000	0.0007	0.0007	1	0	620.90237	621.16857	-0.26620143	-0.0428733
1000	1000	0.0007	0.0007	14	0	3.27513	3.1692274	0.105902595	3.23353867
1000	1000	0.0007	0.0007	14	0.4	3.05279	2.9156892	0.137100787	4.49099961
1000	1000	0.0008	0.0007	1	0	580.96662	581.04999	-0.08337343	-0.0143508
1000	1000	0.0009	0.0007	1	0	547.88585	547.81919	0.066662584	0.01216724
1000	1000	0.001	0.0007	1	0	520.00912	519.70691	0.302206546	0.05811562
1000	1000	0.002	0.0007	1	0	368.42783	367.48828	0.939547267	0.25501528
1000	1000	0.003	0.0007	1	0	301.20623	300.05293	1.153303618	0.38289501
1000	1000	0.003	0.0007	3	0.4	31.44524	30.672077	0.77316309	2.45876034
1000	1000	0.003	0.0007	3	0	33.96053	33.339214	0.62131597	1.82952377
1000	1000	0.004	0.0007	1	0	261.07825	259.85346	1.224793273	0.4691288
1000	1000	0.005	0.0007	1	0	233.65114	232.42	1.231142628	0.52691488
1000	1000	0.006	0.0007	1	0	213.37326	212.16946	1.20380104	0.56417615
1000	1000	0.007	0.0007	1	0	197.58918	196.43075	1.158430337	0.58628227
1000	1000	0.008	0.0007	1	0	184.8478	183.74414	1.103658634	0.59706344
1000	1000	0.009	0.0007	1	0	174.28013	173.23564	1.044492182	0.599318
1000	1000	0.01	0.0007	1	0.4	153.09388	151.1981	1.8957843	1.23831488
1000	1000	0.01	0.0007	1	0	165.32966	164.34576	0.983903775	0.59511631
1000	1000	0.0008	0.0008	1	0	543.54744	543.5225	0.02494	0.00458838
1000	1000	0.0009	0.0008	1	0	512.60645	512.43793	0.168522697	0.03287565
1000	1000	0.001	0.0008	1	0	486.53128	486.1413	0.38997708	0.08015458
1000	1000	0.002	0.0008	1	0	344.76007	343.75381	1.00625809	0.29187199
1000	1000	0.003	0.0008	1	0	281.90085	280.67381	1.227037895	0.43527286
1000	1000	0.004	0.0008	1	0	244.38371	243.07065	1.31305854	0.53729381
1000	1000	0.005	0.0008	1	0	218.7453	217.409	1.3363	0.61089313
1000	1000	0.006	0.0008	1	0	199.79251	198.46636	1.326154159	0.6637657
1000	1000	0.007	0.0008	1	0	185.04143	183.74414	1.297288634	0.7010801
1000	1000	0.008	0.0008	1	0	173.13482	171.87691	1.257914045	0.72655174
1000	1000	0.009	0.0008	1	0	163.25998	162.0471	1.212879027	0.74291264
1000	1000	0.01	0.0008	1	0	154.89655	153.73138	1.165171809	0.7522258
1000	1000	0.0009	0.0009	1	0	483.31592	483.13111	0.184808889	0.0382377
1000	1000	0.001	0.0009	1	0	458.78929	458.33842	0.45087412	0.09827477
1000	1000	0.002	0.0009	1	0	325.14082	324.0942	1.046618053	0.32189685
1000	1000	0.003	0.0009	1	0	265.89171	264.62181	1.269902212	0.47760128
1000	1000	0.004	0.0009	1	0	230.53422	229.16921	1.36501206	0.59210822
1000	1000	0.005	0.0009	1	0	206.37476	204.97517	1.399589079	0.67817842
1000	1000	0.006	0.0009	1	0	188.51728	187.11587	1.401405263	0.74338292
1000	1000	0.007	0.0009	1	0	174.61995	173.23564	1.384312182	0.79275717

1000	1000	0.008	0.0009	1	0	163.4032	162.0471	1.356099027	0.82990971
1000	1000	0.009	0.0009	1	0	154.10093	152.77947	1.32145804	0.85752762
1000	1000	0.01	0.0009	1	0	146.22264	144.93933	1.283306667	0.87763883
1000	1000	0.001	0.001	1	0	435.22642	434.818	0.40842	0.09384081
1000	1000	0.001	0.001	10	0	4.47454	4.34818	0.12636	2.82397744
1000	1000	0.001	0.001	10	0.4	4.1872	4.0003256	0.1868744	4.46299198
1000	1000	0.002	0.001	1	0	308.4512	307.46276	0.988443618	0.32045381
1000	1000	0.003	0.001	1	0	252.25608	251.04229	1.213790652	0.48117399
1000	1000	0.004	0.001	1	0	218.72544	217.409	1.31644	0.60186872
1000	1000	0.005	0.001	1	0	195.81689	194.45652	1.360368832	0.69471476
1000	1000	0.005	0.001	2	0.4	45.73732	44.725	1.01232012	2.21333502
1000	1000	0.006	0.001	1	0	178.88577	177.51371	1.372064837	0.76700614
1000	1000	0.007	0.001	1	0	165.71051	164.34576	1.364753775	0.82357708
1000	1000	0.008	0.001	1	0	155.07728	153.73138	1.345901809	0.86789103
1000	1000	0.009	0.001	1	0	146.25938	144.93933	1.320046667	0.90253813
1000	1000	0.01	0.001	1	0	138.79158	137.50152	1.290055236	0.92949099
1000	1000	0.002	0.002	1	0	218.53763	217.409	1.12863	0.51644653
1000	1000	0.002	0.002	5	0.4	8.37624	8.0006512	0.3755888	4.48397849
1000	1000	0.002	0.002	0.3	0.4	3188.2945	3200.2605	-11.96603	-0.3753113
1000	1000	0.003	0.002	1	0	178.85032	177.51371	1.336614837	0.74733712
1000	1000	0.004	0.002	1	0	155.1847	153.73138	1.453321809	0.93651101
1000	1000	0.005	0.002	1	0	139.02672	137.50152	1.525195236	1.09705187
1000	1000	0.006	0.002	1	0	127.09141	125.52114	1.570265326	1.23554009
1000	1000	0.007	0.002	1	0	117.80804	116.21	1.598041314	1.35647899
1000	1000	0.008	0.002	1	0	110.31866	108.7045	1.61416	1.46317948
1000	1000	0.009	0.002	1	0	104.10976	102.48759	1.622174539	1.55813878
1000	1000	0.01	0.002	1	0	98.85267	97.228261	1.624409416	1.64326307
1000	1000	0.003	0.003	1	0	146.28107	144.93933	1.341736667	0.91723192
1000	1000	0.004	0.003	1	0	126.97416	125.52114	1.453015326	1.14433939
1000	1000	0.005	0.003	1	0	113.79562	112.26952	1.526095158	1.34108427
1000	1000	0.006	0.003	1	0	104.06511	102.48759	1.577524539	1.51590148
1000	1000	0.007	0.003	1	0	96.49959	94.885067	1.614523403	1.67308836
1000	1000	0.008	0.003	1	0	90.3981	88.756853	1.641247419	1.81557734
1000	1000	0.009	0.003	1	0	85.34119	83.680763	1.660426884	1.94563362
1000	1000	0.01	0.003	1	0	81.0605	79.386542	1.673957664	2.06507197
1000	1000	0.004	0.004	1	0	110.14941	108.7045	1.44491	1.3117728
1000	1000	0.005	0.004	1	0	98.74365	97.228261	1.515389416	1.53467025

1000	1000	0.006	0.004	1	0	90.32305	88.756853	1.566197419	1.73399527
1000	1000	0.007	0.004	1	0	83.77774	82.172878	1.604861888	1.9156185
1000	1000	0.008	0.004	1	0	78.50063	76.865689	1.634940905	2.08271055
1000	1000	0.009	0.004	1	0	74.12822	72.469667	1.658553333	2.23741152
1000	1000	0.01	0.004	1	0	70.42787	68.750762	1.677107618	2.38131242
1000	1000	0.005	0.005	1	0	88.44481	86.9636	1.48121	1.674728
1000	1000	0.005	0.005	2	0.4	20.95107	20.001628	0.949442	4.53171127
1000	1000	0.005	0.005	0.2	0.4	1999.7341	2000.1628	-0.42867	-0.0214363
1000	1000	0.006	0.005	1	0	80.91781	79.386542	1.531267664	1.89237408
1000	1000	0.007	0.005	1	0	75.0669	73.497657	1.569243453	2.09045991
1000	1000	0.008	0.005	1	0	70.35015	68.750762	1.599387618	2.27346725
1000	1000	0.009	0.005	1	0	66.44268	64.81884	1.623839611	2.44397067
1000	1000	0.01	0.005	1	0	63.1364	61.492551	1.643848724	2.60364659
1000	1000	0.006	0.006	1	0	73.96954	72.469667	1.499873333	2.0276905
1000	1000	0.007	0.006	1	0	68.63205	67.093874	1.538175976	2.24119194
1000	1000	0.008	0.006	1	0	64.32896	62.760572	1.568387663	2.43807402
1000	1000	0.009	0.006	1	0	60.76438	59.171235	1.593144946	2.62184021
1000	1000	0.01	0.006	1	0	57.7486	56.134762	1.613837579	2.79459169
1000	1000	0.007	0.007	1.4	0.4	32.78175	31.356658	1.42509235	4.34721255
1000	1000	0.007	0.007	1	0	63.62245	62.116857	1.505592857	2.36644904
1000	1000	0.008	0.007	1	0	59.64131	58.104999	1.536310657	2.57591702
1000	1000	0.009	0.007	1	0	56.34318	54.781919	1.561261258	2.77098534
1000	1000	0.01	0.007	1	0	53.55288	51.970691	1.582188655	2.95444177
1000	1000	0.008	0.008	1	0	55.85633	54.35225	1.50408	2.69276553
1000	1000	0.009	0.008	1	0	52.7732	51.243793	1.52940727	2.89807567
1000	1000	0.01	0.008	1	0	50.16453	48.61413	1.550399708	3.09062939
1000	1000	0.009	0.009	1	0	49.81541	48.313111	1.502298889	3.01573125
1000	1000	0.01	0.009	1	0	47.35759	45.833842	1.523748412	3.21753791
1000	1000	0.01	0.01	1	0.4	41.92427	40.003256	1.921014	4.58210483
1000	1000	0.01	0.01	1	0	44.98346	43.4818	1.50166	3.33824921
1000	1000	0.01	0.01	0.1	0.4	15933.632	16001.302	-67.67072	-0.4247037

Bijlage 12: Fouten van de koepelformule ten opzichte van de waarde van ANSYS bij g=(4/k)

P	E	k1	k2	t	v	w (Ansys)	w(formule)	Residual	% Error
1000	1000	0.0005	0.0005	1	0	869.50766	869.636	-0.12834	-0.01476
1000	1000	0.0005	0.0005	20	0.4	2.1219	2.0001628	0.1217372	5.7371789
1000	1000	0.0005	0.0005	20	0	2.26897	2.17409	0.09488	4.1816331
1000	1000	0.0006	0.0005	1	0	794.08838	793.86542	0.222956636	0.0280771
1000	1000	0.0007	0.0005	1	0	735.47254	734.97657	0.495974535	0.0674362
1000	1000	0.0008	0.0005	1	0	688.22274	687.50762	0.71511618	0.1039077
1000	1000	0.0009	0.0005	1	0	649.08352	648.1884	0.895116106	0.1379046
1000	1000	0.001	0.0005	1	0	615.97112	614.92551	1.045607236	0.1697494
1000	1000	0.001	0.0005	13	0.4	3.54849	3.3475235	0.200966499	5.6634371
1000	1000	0.001	0.0005	10	0.4	6.3634	6.1492551	0.214144874	3.3652587
1000	1000	0.002	0.0005	1	0	436.60392	434.818	1.78592	0.4090481
1000	1000	0.003	0.0005	1	0	357.03554	355.02741	2.008129674	0.5624453
1000	1000	0.004	0.0005	1	0	309.52409	307.46276	2.061333618	0.6659687
1000	1000	0.005	0.0005	1	0	277.04308	275.00305	2.040030472	0.7363586
1000	1000	0.006	0.0005	1	0	253.02521	251.04229	1.982920652	0.783685
1000	1000	0.007	0.0005	1	0	234.32889	232.42	1.908892628	0.8146211
1000	1000	0.008	0.0005	1	0	219.23693	217.409	1.82793	0.8337692
1000	1000	0.009	0.0005	1	0	206.7206	204.97517	1.745429079	0.8443421
1000	1000	0.01	0.0005	1	0	196.12077	194.45652	1.664248832	0.8485837
1000	1000	0.01	0.0005	4	0.4	11.89644	11.18125	0.71519003	6.0117987
1000	1000	0.0006	0.0006	1	0	725.10858	724.69667	0.411913333	0.0568071
1000	1000	0.0007	0.0006	1	0	671.60202	670.93874	0.663279762	0.0987608
1000	1000	0.0008	0.0006	1	0	628.47173	627.60572	0.866006629	0.1377956
1000	1000	0.0009	0.0006	1	0	592.74585	591.71235	1.033499457	0.1743579
1000	1000	0.001	0.0006	1	0	562.43845	561.34762	1.09082579	0.1939458
1000	1000	0.002	0.0006	1	0	398.7398	396.93271	1.807088318	0.4531999
1000	1000	0.003	0.0006	1	0	326.12079	324.0942	2.026588053	0.6214225
1000	1000	0.004	0.0006	1	0	282.75747	280.67381	2.083657895	0.7369064
1000	1000	0.005	0.0006	1	0	253.11019	251.04229	2.067900652	0.8169962
1000	1000	0.006	0.0006	1	0	231.18515	229.16921	2.01594206	0.8720033
1000	1000	0.007	0.0006	1	0	214.11522	212.16946	1.94576104	0.9087449
1000	1000	0.008	0.0006	1	0	200.3334	198.46636	1.867044159	0.9319685
1000	1000	0.009	0.0006	1	0	188.90111	187.11587	1.785235263	0.9450634
1000	1000	0.01	0.0006	1	0	179.21707	177.51371	1.703364837	0.9504479

1000	1000	0.0007	0.0007	1	0	621.96223	621.16857	0.793658571	0.1276056
1000	1000	0.0008	0.0007	1	0	582.03485	581.04999	0.984856571	0.1692092
1000	1000	0.0009	0.0007	1	0	548.96271	547.81919	1.143522584	0.2083061
1000	1000	0.001	0.0007	1	0	520.90805	519.70691	1.201136546	0.2305851
1000	1000	0.002	0.0007	1	0	369.39996	367.48828	1.911677267	0.5175088
1000	1000	0.003	0.0007	1	0	302.20476	300.05293	2.151833618	0.7120449
1000	1000	0.004	0.0007	1	0	262.08969	259.85346	2.236233273	0.8532321
1000	1000	0.005	0.0007	1	0	234.66908	232.42	2.249082628	0.958406
1000	1000	0.006	0.0007	1	0	214.39424	212.16946	2.22478104	1.0377056
1000	1000	0.007	0.0007	1	0	198.61114	196.43075	2.180390337	1.0978188
1000	1000	0.008	0.0007	1	0	185.86946	183.74414	2.125318634	1.1434469
1000	1000	0.009	0.0007	1	0	175.30065	173.23564	2.065012182	1.1779832
1000	1000	0.01	0.0007	1	0	166.34844	164.34576	2.002683775	1.203909
1000	1000	0.0008	0.0008	1	0	544.59521	543.5225	1.07271	0.1969738
1000	1000	0.0009	0.0008	1	0	513.66087	512.43793	1.222942697	0.2380837
1000	1000	0.001	0.0008	1	0	487.49052	486.1413	1.34921708	0.2767679
1000	1000	0.002	0.0008	1	0	345.78061	343.75381	2.02679809	0.5861515
1000	1000	0.003	0.0008	1	0	282.95712	280.67381	2.283307895	0.8069448
1000	1000	0.004	0.0008	1	0	245.46833	243.07065	2.39767854	0.9767771
1000	1000	0.005	0.0008	1	0	219.85384	217.409	2.44484	1.1120297
1000	1000	0.006	0.0008	1	0	200.92173	198.46636	2.455374159	1.2220551
1000	1000	0.007	0.0008	1	0	186.18886	183.74414	2.444718634	1.3130316
1000	1000	0.008	0.0008	1	0	174.2985	171.87691	2.421594045	1.3893373
1000	1000	0.009	0.0008	1	0	164.43836	162.0471	2.391259027	1.4541978
1000	1000	0.01	0.0008	1	0	156.08833	153.73138	2.356951809	1.5100115
1000	1000	0.0009	0.0009	1	0	484.41554	483.13111	1.284428889	0.2651502
1000	1000	0.001	0.0009	1	0	459.69096	458.33842	1.35254412	0.294229
1000	1000	0.002	0.0009	1	0	326.11827	324.0942	2.024068053	0.6206546
1000	1000	0.003	0.0009	1	0	266.89846	264.62181	2.276652212	0.8530031
1000	1000	0.004	0.0009	1	0	231.55704	229.16921	2.38783206	1.0312069
1000	1000	0.005	0.0009	1	0	207.40771	204.97517	2.432539079	1.1728296
1000	1000	0.006	0.0009	1	0	189.55688	187.11587	2.441005263	1.2877429
1000	1000	0.007	0.0009	1	0	175.66402	173.23564	2.428382182	1.3824016
1000	1000	0.008	0.0009	1	0	164.45029	162.0471	2.403189027	1.4613468
1000	1000	0.009	0.0009	1	0	155.15004	152.77947	2.37056804	1.5279197
1000	1000	0.01	0.0009	1	0	147.27303	144.93933	2.333696667	1.5846056
1000	1000	0.001	0.001	1	0	436.26161	434.818	1.44361	0.3309047

1000	1000	0.001	0.001	0.5	0.4	1596.6796	1600.1302	-3.45064	-0.216113
1000	1000	0.001	0.001	10	0.4	4.23639	4.0003256	0.2360644	5.5723009
1000	1000	0.002	0.001	1	0	309.53975	307.46276	2.076993618	0.6709942
1000	1000	0.003	0.001	1	0	253.37745	251.04229	2.335160652	0.9216134
1000	1000	0.004	0.001	1	0	219.87231	217.409	2.46331	1.1203366
1000	1000	0.005	0.001	1	0	196.98547	194.45652	2.528948832	1.2838251
1000	1000	0.006	0.001	1	0	180.07318	177.51371	2.559474837	1.4213526
1000	1000	0.007	0.001	1	0	166.91446	164.34576	2.568703775	1.5389342
1000	1000	0.008	0.001	1	0	156.29593	153.73138	2.564551809	1.6408308
1000	1000	0.009	0.001	1	0	147.49124	144.93933	2.551906667	1.730209
1000	1000	0.01	0.001	1	0	140.03544	137.50152	2.533915236	1.8094814
1000	1000	0.002	0.002	1	0	219.06463	217.409	1.65563	0.7557724
1000	1000	0.003	0.002	1	0	179.42774	177.51371	1.914034837	1.0667441
1000	1000	0.004	0.002	1	0	155.80206	153.73138	2.070681809	1.3290465
1000	1000	0.005	0.002	1	0	139.67569	137.50152	2.174165236	1.556581
1000	1000	0.006	0.002	1	0	127.76732	125.52114	2.246175326	1.7580202
1000	1000	0.007	0.002	1	0	118.508	116.21	2.298001314	1.9391107
1000	1000	0.008	0.002	1	0	111.04057	108.7045	2.33607	2.1037986
1000	1000	0.009	0.002	1	0	104.85194	102.48759	2.364354539	2.2549459
1000	1000	0.01	0.002	1	0	99.61371	97.228261	2.385449416	2.3946999
1000	1000	0.003	0.003	1	0	146.78456	144.93933	1.845226667	1.2570986
1000	1000	0.004	0.003	1	0	127.51638	125.52114	1.995235326	1.5646894
1000	1000	0.005	0.003	1	0	114.37021	112.26952	2.100685158	1.8367415
1000	1000	0.006	0.003	1	0	104.66575	102.48759	2.178164539	2.0810671
1000	1000	0.007	0.003	1	0	97.12188	94.885067	2.236813403	2.3030994
1000	1000	0.008	0.003	1	0	91.03909	88.756853	2.282237419	2.5068764
1000	1000	0.009	0.003	1	0	85.99885	83.680763	2.318086884	2.6954859
1000	1000	0.01	0.003	1	0	81.73332	79.386542	2.346777664	2.8712619
1000	1000	0.004	0.004	1	0	110.64103	108.7045	1.93653	1.750282
1000	1000	0.005	0.004	1	0	99.26745	97.228261	2.039189416	2.0542377
1000	1000	0.006	0.004	1	0	90.87495	88.756853	2.118097419	2.3307825
1000	1000	0.007	0.004	1	0	84.35315	82.172878	2.180271888	2.5846953
1000	1000	0.008	0.004	1	0	79.09583	76.865689	2.230140905	2.819543
1000	1000	0.009	0.004	1	0	74.74043	72.469667	2.270763333	3.0381995
1000	1000	0.01	0.004	1	0	71.05507	68.750762	2.304307618	3.2429883
1000	1000	0.005	0.005	1	0	88.92418	86.9636	1.96058	2.2047771
1000	1000	0.006	0.005	1	0	81.42277	79.386542	2.036227664	2.5008086

1000	1000	0.007	0.005	1	0	75.59532	73.497657	2.097663453	2.7748589
1000	1000	0.008	0.005	1	0	70.89912	68.750762	2.148357618	3.0301612
1000	1000	0.009	0.005	1	0	67.00947	64.81884	2.190629611	3.2691344
1000	1000	0.01	0.005	1	0	63.71878	61.492551	2.226228724	3.4938345
1000	1000	0.006	0.006	1	0	74.44371	72.469667	1.974043333	2.6517262
1000	1000	0.007	0.006	1	0	69.12758	67.093874	2.033705976	2.9419603
1000	1000	0.008	0.006	1	0	64.8446	62.760572	2.084027663	3.21388
1000	1000	0.009	0.006	1	0	61.29814	59.171235	2.126904946	3.4697708
1000	1000	0.01	0.006	1	0	58.29847	56.134762	2.163707579	3.7114312
1000	1000	0.007	0.007	1	0	64.09346	62.116857	1.976602857	3.0839385
1000	1000	0.008	0.007	1	0	60.1335	58.104999	2.028500657	3.3733288
1000	1000	0.009	0.007	1	0	56.85492	54.781919	2.073001258	3.6461247
1000	1000	0.01	0.007	1	0	54.08219	51.970691	2.111498655	3.9042403
1000	1000	0.008	0.008	1	0	56.24665	54.35225	1.8944	3.3680228
1000	1000	0.009	0.008	1	0	53.17875	51.243793	1.93495727	3.6385911
1000	1000	0.01	0.008	1	0	50.58495	48.61413	1.970819708	3.8960594
1000	1000	0.009	0.009	1	0	50.20035	48.313111	1.887238889	3.7594138
1000	1000	0.01	0.009	1	0	47.75643	45.833842	1.922588412	4.0258211
1000	1000	0.01	0.01	1	0	45.36333	43.4818	1.88153	4.1476893
1000	1000	0.01	0.01	0.1	0.4	15964.097	16001.302	-37.20578	-0.233059
1000	1000	0.01	0.01	1	0.4	42.36393	40.003256	2.360674	5.5723678

Bijlage 13: Onderzoek naar de correcte waarde van 'g' bij Cilinders

Bij een cilinder is de kromming in een richting k1=0. In de andere richting mag de kromming van alles zijn. Hieronder wordt weer onderzocht hoe groot "g" bij cilinders moet zijn zodat die parameter geen invloed meer heeft op de uitkomsten.

g	K1	K2	w	Verschil %
500	0	0.001	1687.27763	9.34
600	0	0.001	1845.35036	
700	0	0.001	2000.4841	6.83
800	0	0.001	2137.28955	
900	0	0.001	2265.19602	5.33
1000	0	0.001	2386.03234	5.3
1100	0	0.001	2512.68262	
2000	0	0.001	3375.23488	2.91
2100	0	0.001	3473.22869	
2500	0	0.001	3773.53684	1.75
2600	0	0.001	3839.39529	
2900	0		4058.40372 Hn=50 = 4064.8	2.0
3000	0	0.001	4140.45232	

g	K1	K2	w	Verschil %
500	0	0.01	298.56593	8.74
600	0	0.01	324.66561	
700	0	0.01	356.66058	6.64
800	0	0.01	380.35100	
900	0	0.01	402.51034	5.20
1000	0	0.01	423.38587	
2000	0	0.01	601.60235	
2100	0	0.01		

ook voor grotere waardes van "g", verandere de uitkomsten nog steeds!

$restart;\ h1 := 0.005 : hn := 30 : g := 3000 :$
$w3000 := 6967.21803 : w2900 := 6826.72223 :$
$$\frac{(w3000 - w2900)}{w2900} \cdot 100$$
2.058027195

$restart;\ h1 := 0.1 : hn := 50 :\ \ w3000 := 6936.74493 : w2900 := 6846.20535 :$
$$\frac{(w3000 - w2900)}{w2900} \cdot 100$$
1.322478298

$restart;\ clc : h1 := 0.1 : hn := 50 :\ \ w5000 := 8968.40152 : w4900 := 8898.51492 :$
$$\frac{(w5000 - w4900)}{w4900} \cdot 100$$
0.7853737464

$restart;\ h1 := 0.1 : hn := 70 :\ \ w3000 := 6911.55828 : w2900 := 6861.2343 :$
$$\frac{(w3000 - w2900)}{w2900} \cdot 100$$
0.7334537461

$restart;\ clc : h1 := 0.1 : hn := 70 :\ \ w4000 := 8014.30910 : w3900 := 7900.29582 :$
$$\frac{(w4000 - w3900)}{w3900} \cdot 100$$
1.443152036

$restart;\ clc : h1 := 0.1 : hn := 70 :\ \ w5000 := 8952.61077 : w4900 := 8850.87357 :$
$$\frac{(w5000 - w4900)}{w4900} \cdot 100$$
1.149459420

$restart;\ clc : h1 := 0.1 : hn := 70 :\ \ w7000 := 10609.19616 : w6900 := 10523.02661 :$
$$\frac{(w7000 - w6900)}{w6900} \cdot 100$$
0.8188665979

$restart;\ clc : h1 := 0.1 : hn := 100 :\ \ w7000 := 10544.15017 : w6900 := 10537.34334 :$
$$\frac{(w7000 - w6900)}{w6900} \cdot 100$$
0.06459721184

$restart;\ clc : h1 := 0.1 : hn := 100 :\ \ w8000 := 11323.74340 : w7900 := 11248.31209 :$
$$\frac{(w8000 - w7900)}{w7900} \cdot 100 :$$
$restart;\ clc : h1 := 0.1 : hn := 100 :\ \ w10000 := 12672.72814 : w9900 := 12604.45516 :$
$$\frac{(w10000 - w9900)}{w9900} \cdot 100$$
0.5416575261

$evalf(225 \cdot \mathrm{sqrt}(100))$

2250.

$k := 0.01 : hn = 100$

$w2250 := 630.05857 : w2300 := 636.68099 :$

$$\frac{(w2250 - w2300)}{w2250} \cdot 100$$

-1.051080061

Conclusie:

Bij een cilinder waarbij een van de krommingen nul is en de andere kromming verandert, heeft ‘’g’’ een grote invloed op de verplaatsing onder de punt last. Zelfs g=3000 is niet voldoende groot om de invloed van ‘’g’’ weg te werken. Daarom wordt eerst geprobeerd om de invloed van "g" ook in het eind formule voor cilinder mee te nemen!

Bijlage 14: Eigenschappen van cilinderformule die een verband beschrijft tussen g, k en t = 1.

Model Definition:
Y = a*x1^(0.5)*x2^(-0.75)

Number of observations = 285
Number of missing observations = 0
Solver type: Nonlinear
Nonlinear iteration limit = 250
Diverging nonlinear iteration limit =10
Number of nonlinear iterations performed = 5
Residual tolerance = 0.0000000001
Sum of Residuals = -289.512656905377
Average Residual = -1.01583388387852
Residual Sum of Squares (Absolute) = 2368099.9008757
Residual Sum of Squares (Relative) = 2368099.9008757
Standard Error of the Estimate = 91.3147300968518
Coefficient of Multiple Determination (R^2) = 0.9990504815
Proportion of Variance Explained = 99.90504815%
Adjusted coefficient of multiple determination (Ra^2) = 0.9990471381
Durbin-Watson statistic = 1.45806509317255

Regression Variable Results

Variable	Value	Standard Error	t-ratio	Prob(t)
a	0.422647	5.86E-04	721.8288	0

68% Confidence Intervals

Variable	Value	68% (+/-)	Lower Limit	Upper Limit
a	0.422647	5.83E-04	0.422064	0.42323

90% Confidence Intervals

Variable	Value	90% (+/-)	Lower Limit	Upper Limit
a	0.422647	9.66E-04	0.421681	0.423613

95% Confidence Intervals

Variable	Value	95% (+/-)	Lower Limit	Upper Limit
a	0.422647	1.15E-03	0.421494	0.423799

99% Confidence Intervals

Variable	Value	99% (+/-)	Lower Limit	Upper Limit
a	0.422647	1.52E-03	0.421128	0.424165

Variance Analysis

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob(F)
Regression	1	2.49E+09	2.49E+09	298815	0
Error	284	2368100	8338.38		
Total	285	2.49E+09			

Bijlage 15: Originele datapunten en de fouten bij de cilinderformule met variabele grondstraal

P	E	g	t	k	w ANSYS	W calc	residual	error %
1000	1000	100	1	0.0001	4980.997	4226.469	754.5279	15.14813
1000	1000	200	1	0.0001	5402.14	5977.13	-574.99	-10.6437
1000	1000	300	1	0.0001	6429.711	7320.46	-890.749	-13.8536
1000	1000	400	1	0.0001	8125.456	8452.939	-327.482	-4.03032
1000	1000	500	1	0.0001	9456.764	9450.673	6.09169	0.064416
1000	1000	500	100	0.0001	0.18149	0.298857	-0.11737	-64.6683
1000	1000	600	1	0.0001	10383.66	10352.69	30.96963	0.298253
1000	1000	700	1	0.0001	11163.64	11182.19	-18.5515	-0.16618
1000	1000	800	1	0.0001	11910.28	11954.26	-43.9774	-0.36924
1000	1000	900	1	0.0001	12647.56	12679.41	-31.8521	-0.25184
1000	1000	1000	1	0.0001	13364.03	13365.27	-1.24008	-0.00928
1000	1000	1000	50	0.0001	2.23049	2.010459	0.220031	9.864681
1000	1000	1100	1	0.0001	14052.87	14017.61	35.25443	0.25087
1000	1000	1200	1	0.0001	14699.81	14640.92	58.8929	0.400637
1000	1000	1300	1	0.0001	15311.2	15238.75	72.44765	0.473168
1000	1000	1400	1	0.0001	15892.22	15814	78.21991	0.49219
1000	1000	1400	20	0.0001	16.57707	18.69495	-2.11788	-12.776
1000	1000	1500	1	0.0001	16448.71	16369.05	79.66461	0.484321
1000	1000	100	1	0.0002	2807.965	2513.074	294.8908	10.50194
1000	1000	200	1	0.0002	3086.616	3554.023	-467.407	-15.143
1000	1000	300	1	0.0002	4243.845	4352.771	-108.926	-2.56668
1000	1000	400	1	0.0002	5048.546	5026.147	22.3984	0.44366
1000	1000	500	1	0.0002	5606.253	5619.404	-13.1505	-0.23457
1000	1000	600	1	0.0002	6130.111	6155.748	-25.6368	-0.41821
1000	1000	700	1	0.0002	6648.641	6648.968	-0.32744	-0.00492
1000	1000	800	1	0.0002	7129.49	7108.046	21.44403	0.300779
1000	1000	900	1	0.0002	7572.944	7539.221	33.72282	0.445307
1000	1000	1000	1	0.0002	7984.467	7947.037	37.43037	0.46879
1000	1000	1100	1	0.0002	8377.201	8334.923	42.27822	0.504682
1000	1000	1200	1	0.0002	8748.114	8705.543	42.57113	0.486632
1000	1000	1300	1	0.0002	9104.798	9061.016	43.78189	0.480866
1000	1000	1400	1	0.0002	9448.807	9403.061	45.74609	0.484147
1000	1000	1500	1	0.0002	9780.807	9733.093	47.71434	0.487836
1000	1000	100	1	0.0003	1819.184	1854.115	-34.9314	-1.92017
1000	1000	200	1	0.0003	2412.665	2622.115	-209.45	-8.68127
1000	1000	300	1	0.0003	3217.901	3211.422	6.478594	0.20133

1000	1000	400	1	0.0003	3702.675	3708.231	-5.55601	-0.15005
1000	1000	500	1	0.0003	4130.81	4145.928	-15.1185	-0.36599
1000	1000	600	1	0.0003	4541.397	4541.637	-0.23992	-0.00528
1000	1000	700	1	0.0003	4927.049	4905.528	21.52066	0.436786
1000	1000	800	1	0.0003	5270.878	5244.231	26.64779	0.505566
1000	1000	900	1	0.0003	5588.782	5562.346	26.43507	0.473002
1000	1000	1000	1	0.0003	5889.091	5863.228	25.86254	0.43916
1000	1000	1100	1	0.0003	6180.844	6149.405	31.43888	0.50865
1000	1000	1200	1	0.0003	6455.979	6422.844	33.13412	0.513232
1000	1000	1300	1	0.0003	6719.519	6685.108	34.41012	0.512092
1000	1000	1400	1	0.0003	6972.474	6937.465	35.00952	0.50211
1000	1000	1500	1	0.0003	7215.97	7180.958	35.01135	0.485193
1000	1000	100	1	0.0004	1351.579	1494.283	-142.703	-10.5583
1000	1000	200	1	0.0004	2034.156	2113.235	-79.0785	-3.88753
1000	1000	300	1	0.0004	2593.241	2588.173	5.06722	0.195401
1000	1000	400	1	0.0004	2977.029	2988.565	-11.5359	-0.3875
1000	1000	500	1	0.0004	3339.414	3341.317	-1.90329	-0.05699
1000	1000	600	1	0.0004	3669.869	3660.23	9.639145	0.262656
1000	1000	700	1	0.0004	3974.871	3953.5	21.37101	0.537653
1000	1000	800	1	0.0004	4247.625	4226.469	21.15597	0.498066
1000	1000	900	1	0.0004	4503.614	4482.848	20.7665	0.461108
1000	1000	1000	1	0.0004	4746.585	4725.336	21.24844	0.447657
1000	1000	1100	1	0.0004	4982.793	4955.975	26.8184	0.53822
1000	1000	1200	1	0.0004	5203.814	5176.347	27.46726	0.527829
1000	1000	1300	1	0.0004	5415.199	5387.712	27.48657	0.507582
1000	1000	1400	1	0.0004	5618.307	5591.093	27.21314	0.484366
1000	1000	1500	1	0.0004	5814.167	5787.332	26.83552	0.461554
1000	1000	100	1	0.0005	1099.413	1264.009	-164.596	-14.9713
1000	1000	200	1	0.0005	1765.771	1787.579	-21.8075	-1.23501
1000	1000	300	1	0.0005	2184.226	2189.328	-5.10181	-0.23358
1000	1000	400	1	0.0005	2521.15	2528.018	-6.86857	-0.27244
1000	1000	500	1	0.0005	2832.261	2826.41	5.850638	0.206571
1000	1000	500	20	0.0005	2.89313	3.341318	-0.44819	-15.4915
1000	1000	600	1	0.0005	3106.575	3096.177	10.39785	0.334705
1000	1000	700	1	0.0005	3362.34	3344.254	18.0862	0.537905
1000	1000	800	1	0.0005	3592.97	3575.158	17.81197	0.495745
1000	1000	900	1	0.0005	3810.154	3792.027	18.12613	0.475732
1000	1000	1000	1	0.0005	4015.491	3997.148	18.34266	0.456797
1000	1000	1000	20	0.0005	4.78893	4.725337	0.063593	1.327914
1000	1000	1100	1	0.0005	4215.234	4192.244	22.99038	0.545412
1000	1000	1200	1	0.0005	4401.549	4378.656	22.89275	0.520107

1000	1000	1300	1	0.0005	4580.026	4557.45	22.57581	0.492919
1000	1000	1400	1	0.0005	4751.722	4729.489	22.23317	0.467897
1000	1000	1400	10	0.0005	26.75693	26.59588	0.161054	0.601914
1000	1000	1500	1	0.0005	4917.329	4895.486	21.84248	0.444194
1000	1000	100	1	0.0006	946.5668	1102.464	-155.897	-16.4697
1000	1000	200	1	0.0006	1559.534	1559.119	0.414859	0.026601
1000	1000	300	1	0.0006	1899.301	1909.523	-10.2222	-0.53821
1000	1000	400	1	0.0006	2203.755	2204.927	-1.17197	-0.05318
1000	1000	500	1	0.0006	2473.877	2465.184	8.692996	0.351392
1000	1000	600	1	0.0006	2709.205	2700.473	8.731064	0.322274
1000	1000	700	1	0.0006	2932.586	2916.845	15.74139	0.536775
1000	1000	800	1	0.0006	3134.261	3118.238	16.02263	0.511209
1000	1000	900	1	0.0006	3323.602	3307.391	16.21147	0.487768
1000	1000	1000	1	0.0006	3502.059	3486.296	15.76283	0.450102
1000	1000	1100	1	0.0006	3676.319	3656.458	19.86019	0.540219
1000	1000	1200	1	0.0006	3838.623	3819.046	19.57732	0.510009
1000	1000	1300	1	0.0006	3994.229	3974.989	19.23986	0.481691
1000	1000	1400	1	0.0006	4143.906	4125.041	18.86482	0.455243
1000	1000	1500	1	0.0006	4288.218	4269.823	18.3945	0.428954
1000	1000	100	1	0.0007	844.7904	982.0966	-137.306	-16.2533
1000	1000	200	1	0.0007	1396.01	1388.894	7.115713	0.509718
1000	1000	300	1	0.0007	1689.736	1701.041	-11.3054	-0.66906
1000	1000	400	1	0.0007	1967.241	1964.193	3.047742	0.154925
1000	1000	500	1	0.0007	2205.056	2196.035	9.020871	0.409099
1000	1000	600	1	0.0007	2412.654	2405.635	7.018358	0.290898
1000	1000	700	1	0.0007	2612.729	2598.383	14.34562	0.549066
1000	1000	700	15	0.0007	5.93201	5.868106	0.063904	1.077275
1000	1000	800	1	0.0007	2792.528	2777.789	14.73904	0.527803
1000	1000	900	1	0.0007	2960.751	2946.29	14.46119	0.48843
1000	1000	1000	1	0.0007	3119.23	3105.662	13.56832	0.434989
1000	1000	1100	1	0.0007	3274.73	3257.246	17.48442	0.533919
1000	1000	1200	1	0.0007	3419.264	3402.082	17.18188	0.502502
1000	1000	1300	1	0.0007	3557.811	3541	16.81145	0.472522
1000	1000	1400	1	0.0007	3691.033	3674.669	16.36365	0.443335
1000	1000	1500	1	0.0007	3819.47	3803.644	15.82584	0.414347
1000	1000	100	1	0.0008	771.761	888.5057	-116.745	-15.1271
1000	1000	200	1	0.0008	1264.088	1256.537	7.551405	0.59738
1000	1000	300	1	0.0008	1528.572	1538.937	-10.365	-0.67808
1000	1000	400	1	0.0008	1782.636	1777.011	5.624107	0.315494
1000	1000	500	1	0.0008	1995.13	1986.759	8.370436	0.419543
1000	1000	600	1	0.0008	2182.157	2176.386	5.771265	0.264475

1000	1000	700	1	0.0008	2364.188	2350.765	13.42239	0.567738
1000	1000	800	1	0.0008	2526.653	2513.074	13.57935	0.537444
1000	1000	900	1	0.0008	2678.407	2665.517	12.89009	0.481259
1000	1000	1000	1	0.0008	2821.514	2809.702	11.81257	0.418661
1000	1000	1100	1	0.0008	2962.522	2946.84	15.6821	0.52935
1000	1000	1200	1	0.0008	3093.226	3077.874	15.3519	0.496307
1000	1000	1300	1	0.0008	3218.475	3203.553	14.92214	0.46364
1000	1000	1400	1	0.0008	3338.902	3324.484	14.41798	0.431818
1000	1000	1500	1	0.0008	3455.02	3441.168	13.85201	0.400924
1000	1000	100	1	0.0009	716.1465	813.3844	-97.2379	-13.5779
1000	1000	200	1	0.0009	1156.177	1150.299	5.877722	0.508376
1000	1000	300	1	0.0009	1400.154	1408.823	-8.66877	-0.61913
1000	1000	400	1	0.0009	1633.725	1626.769	6.956549	0.425809
1000	1000	500	1	0.0009	1826.274	1818.783	7.491127	0.410186
1000	1000	600	1	0.0009	1997.311	1992.377	4.934132	0.247039
1000	1000	700	1	0.0009	2164.687	2152.013	12.67366	0.585473
1000	1000	800	1	0.0009	2313.085	2300.599	12.48679	0.539832
1000	1000	900	1	0.0009	2451.705	2440.153	11.55163	0.471167
1000	1000	1000	1	0.0009	2582.575	2572.147	10.42773	0.403773
1000	1000	1100	1	0.0009	2711.951	2697.691	14.26041	0.525836
1000	1000	1200	1	0.0009	2831.528	2817.646	13.88155	0.490249
1000	1000	1300	1	0.0009	2946.102	2932.699	13.40259	0.454926
1000	1000	1400	1	0.0009	3056.277	3043.406	12.87142	0.421147
1000	1000	1500	1	0.0009	3162.521	3150.224	12.29719	0.388841
1000	1000	1500	10	0.0009	17.95807	17.71502	0.243054	1.353455
1000	1000	100	1	0.001	671.7377	751.5843	-79.8466	-11.8866
1000	1000	200	1	0.001	1066.743	1062.901	3.84249	0.360208
1000	1000	300	1	0.001	1294.917	1301.782	-6.86542	-0.53018
1000	1000	400	1	0.001	1510.646	1503.169	7.477296	0.494973
1000	1000	500	1	0.001	1687.278	1680.594	6.68395	0.396138
1000	1000	600	1	0.001	1845.35	1840.998	4.352223	0.235848
1000	1000	700	1	0.001	2000.484	1988.505	11.97884	0.598797
1000	1000	800	1	0.001	2137.29	2125.802	11.48801	0.537504
1000	1000	900	1	0.001	2265.196	2254.753	10.44299	0.461019
1000	1000	1000	1	0.001	2386.032	2376.718	9.313965	0.390354
1000	1000	1000	5	0.001	64.06456	63.5763	0.488255	0.76213
1000	1000	1100	1	0.001	2505.816	2492.723	13.09272	0.522493
1000	1000	1200	1	0.001	2616.232	2603.565	12.66699	0.484169
1000	1000	1300	1	0.001	2722.036	2709.876	12.16028	0.446735
1000	1000	1400	1	0.001	2823.79	2812.171	11.61874	0.411459
1000	1000	1500	1	0.001	2921.914	2910.874	11.04058	0.377854

1000	1000	100	1	0.002	442.3163	446.8947	-4.57844	-1.03511
1000	1000	200	1	0.002	632.7266	632.0046	0.722021	0.114113
1000	1000	300	1	0.002	773.0518	774.0444	-0.99255	-0.12839
1000	1000	400	1	0.002	898.9978	893.7894	5.208353	0.579351
1000	1000	500	1	0.002	1002.936	999.287	3.648629	0.363795
1000	1000	600	1	0.002	1095.648	1094.664	0.983958	0.089806
1000	1000	700	1	0.002	1189.68	1182.372	7.307489	0.61424
1000	1000	800	1	0.002	1270.326	1264.009	6.316612	0.497243
1000	1000	900	1	0.002	1345.841	1340.684	5.157199	0.383195
1000	1000	1000	1	0.002	1417.131	1413.205	3.925739	0.27702
1000	1000	1100	1	0.002	1489.583	1482.182	7.400931	0.496846
1000	1000	1200	1	0.002	1554.988	1548.089	6.899286	0.443687
1000	1000	1300	1	0.002	1617.672	1611.302	6.370139	0.393784
1000	1000	1400	1	0.002	1677.951	1672.127	5.824226	0.347103
1000	1000	1500	1	0.002	1736.074	1730.816	5.257928	0.302863
1000	1000	100	1	0.003	332.8878	329.7135	3.17425	0.953549
1000	1000	200	1	0.003	469.806	466.2854	3.52067	0.749388
1000	1000	300	1	0.003	569.0731	571.0806	-2.00746	-0.35276
1000	1000	400	1	0.003	663.7091	659.4271	4.281979	0.645159
1000	1000	500	1	0.003	739.3997	737.2619	2.13777	0.289122
1000	1000	600	1	0.003	806.9895	807.6299	-0.64042	-0.07936
1000	1000	700	1	0.003	877.7496	872.34	5.409518	0.616294
1000	1000	800	1	0.003	936.9439	932.5707	4.373169	0.466748
1000	1000	900	1	0.003	992.3827	989.1406	3.242069	0.326695
1000	1000	1000	1	0.003	1044.702	1042.646	2.055837	0.196787
1000	1000	1100	1	0.003	1098.994	1093.536	5.457568	0.496597
1000	1000	1200	1	0.003	1147.152	1142.161	4.991252	0.435099
1000	1000	1300	1	0.003	1193.308	1188.799	4.508484	0.377814
1000	1000	1400	1	0.003	1237.691	1233.675	4.015626	0.324445
1000	1000	1500	1	0.003	1280.485	1276.975	3.510199	0.27413
1000	1000	100	1	0.004	268.0231	265.7252	2.297878	0.857343
1000	1000	200	1	0.004	379.981	375.7922	4.188819	1.102376
1000	1000	300	1	0.004	457.7248	460.2495	-2.52473	-0.55158
1000	1000	400	1	0.004	535.0011	531.4504	3.550745	0.663689
1000	1000	500	1	0.004	595.4401	594.1796	1.260456	0.211685
1000	1000	600	1	0.004	649.4028	650.8911	-1.48832	-0.22918
1000	1000	700	1	0.004	707.4557	703.0428	4.412884	0.623768
1000	1000	700	2	0.004	148.5919	147.7966	0.79534	0.535251
1000	1000	800	1	0.004	754.9958	751.5843	3.411408	0.451845
1000	1000	900	1	0.004	799.5118	797.1756	2.336263	0.292211
1000	1000	1000	1	0.004	841.5116	840.2968	1.21477	0.144356

1000	1000	1100	1	0.004	885.9185	881.3108	4.607739	0.520109
1000	1000	1200	1	0.004	924.6975	920.4991	4.198402	0.45403
1000	1000	1300	1	0.004	961.8648	958.0858	3.779013	0.392884
1000	1000	1400	1	0.004	997.6066	994.2526	3.353961	0.336201
1000	1000	1500	1	0.004	1032.07	1029.149	2.921055	0.283029
1000	1000	100	1	0.005	226.2411	224.7761	1.464994	0.647537
1000	1000	200	1	0.005	321.984	317.8815	4.102556	1.274149
1000	1000	300	1	0.005	386.5069	389.3237	-2.81677	-0.72877
1000	1000	400	1	0.005	452.561	449.5523	3.008738	0.664825
1000	1000	500	1	0.005	503.3288	502.6147	0.714048	0.141865
1000	1000	600	1	0.005	548.5997	550.5869	-1.98713	-0.36222
1000	1000	700	1	0.005	598.5416	594.7018	3.839787	0.641524
1000	1000	800	1	0.005	638.6504	635.7629	2.887452	0.452118
1000	1000	900	1	0.005	676.2027	674.3284	1.874302	0.27718
1000	1000	900	2	0.005	143.177	141.7601	1.416877	0.989598
1000	1000	1000	1	0.005	711.6241	710.8046	0.819465	0.115154
1000	1000	1100	1	0.005	749.7299	745.4981	4.231722	0.564433
1000	1000	1200	1	0.005	782.5304	778.6474	3.88303	0.496215
1000	1000	1300	1	0.005	813.9698	810.4419	3.52787	0.433415
1000	1000	1400	1	0.005	844.2047	841.0353	3.169343	0.375424
1000	1000	1500	1	0.005	873.3595	870.5543	2.80527	0.321204
1000	1000	100	1	0.006	197.3034	196.0488	1.254526	0.635836
1000	1000	200	1	0.006	281.1732	277.2549	3.918296	1.393552
1000	1000	300	1	0.006	336.4929	339.5666	-3.07366	-0.91344
1000	1000	400	1	0.006	394.7279	392.0977	2.630182	0.666328
1000	1000	500	1	0.006	438.7266	438.3785	0.348018	0.079325
1000	1000	600	1	0.006	477.9271	480.2196	-2.2925	-0.47968
1000	1000	700	1	0.006	522.1916	518.6965	3.495124	0.669318
1000	1000	800	1	0.006	557.1053	554.5099	2.595422	0.465876
1000	1000	900	1	0.006	589.7887	588.1465	1.642138	0.278428
1000	1000	1000	1	0.006	620.6105	619.9609	0.64966	0.104681
1000	1000	1100	1	0.006	654.2151	650.2205	3.994634	0.610599
1000	1000	1200	1	0.006	682.844	679.1331	3.710853	0.543441
1000	1000	1300	1	0.006	710.2862	706.8642	3.42207	0.481787
1000	1000	1400	1	0.006	738.4748	733.5476	4.927214	0.667215
1000	1000	1500	1	0.006	764.1475	759.2939	4.853602	0.635166
1000	1000	100	1	0.007	176.0224	174.6442	1.378189	0.782962
1000	1000	200	1	0.007	250.7612	246.9842	3.777019	1.506221
1000	1000	300	1	0.007	299.1946	302.4926	-3.29805	-1.10231
1000	1000	400	1	0.007	351.6412	349.2884	2.352799	0.669091
1000	1000	500	1	0.007	390.6135	390.5163	0.097173	0.024877

1000	1000	600	1	0.007	425.3059	427.7892	-2.48331	-0.58389
1000	1000	700	1	0.007	465.3508	462.0651	3.28562	0.706052
1000	1000	800	1	0.007	496.4049	493.9684	2.436517	0.490833
1000	1000	900	1	0.007	525.4706	523.9326	1.537968	0.292684
1000	1000	1000	1	0.007	552.8745	552.2735	0.601054	0.108714
1000	1000	1100	1	0.007	578.8478	579.2293	-0.38149	-0.0659
1000	1000	1200	1	0.007	603.5744	604.9853	-1.41088	-0.23375
1000	1000	1300	1	0.007	627.2073	629.6887	-2.48134	-0.39562
1000	1000	1400	1	0.007	656.9917	653.4588	3.532939	0.537745
1000	1000	1500	1	0.007	679.6549	676.3941	3.26082	0.479776
1000	1000	100	1	0.008	159.6178	158.0011	1.616635	1.012816
1000	1000	200	1	0.008	227.1233	223.4474	3.675898	1.61846
1000	1000	300	1	0.008	270.1855	273.666	-3.48056	-1.28821
1000	1000	400	1	0.008	318.1447	316.0023	2.14237	0.673395
1000	1000	500	1	0.008	353.2233	353.3013	-0.07799	-0.02208
1000	1000	600	1	0.008	384.4201	387.0222	-2.60206	-0.67688
1000	1000	700	1	0.008	421.1916	418.0317	3.159824	0.750211
1000	1000	800	1	0.008	449.2519	446.8947	2.357176	0.524689
1000	1000	900	1	0.008	475.5105	474.0034	1.507106	0.316945
1000	1000	1000	1	0.008	500.2618	499.6435	0.61832	0.123599
1000	1000	1100	1	0.008	523.7144	524.0305	-0.31611	-0.06036
1000	1000	1200	1	0.008	546.0343	547.332	-1.29771	-0.23766
1000	1000	1300	1	0.008	567.3596	569.6812	-2.32167	-0.40921
1000	1000	1400	1	0.008	594.8782	591.1862	3.69201	0.620633
1000	1000	1500	1	0.008	615.3955	611.9358	3.459698	0.562191
1000	1000	100	1	0.009	146.6312	144.6425	1.988736	1.356284
1000	1000	200	1	0.009	208.3919	204.5553	3.836502	1.841004
1000	1000	300	1	0.009	253.3353	250.5281	2.807196	1.108095
1000	1000	400	1	0.009	293.5684	289.2849	4.283422	1.459088
1000	1000	500	1	0.009	327.2259	323.4304	3.795445	1.159886
1000	1000	600	1	0.009	357.5264	354.3003	3.226173	0.902359
1000	1000	700	1	0.009	387.3965	382.688	4.708435	1.215405
1000	1000	800	1	0.009	413.6822	409.1107	4.571473	1.105069
1000	1000	900	1	0.009	438.3567	433.9274	4.429288	1.01043
1000	1000	1000	1	0.009	461.6815	457.3997	4.281846	0.927446
1000	1000	1100	1	0.009	479.5009	479.7248	-0.22397	-0.04671
1000	1000	1200	1	0.009	499.8899	501.0562	-1.16637	-0.23333
1000	1000	1300	1	0.009	519.3631	521.5159	-2.15281	-0.41451
1000	1000	1400	1	0.009	545.0646	541.2026	3.862048	0.708549
1000	1000	1500	1	0.009	563.8589	560.1979	3.661017	0.649279
1000	1000	100	1	0.01	135.7215	133.6527	2.068814	1.524308

1000	1000	200	1	0.01	192.5358	189.0135	3.522375	1.829464
1000	1000	300	1	0.01	235.8239	231.4933	4.33062	1.836379
1000	1000	400	1	0.01	271.3271	267.3054	4.021728	1.482243
1000	1000	500	1	0.01	303.6059	298.8565	4.749386	1.564326
1000	1000	600	1	0.01	332.0593	327.3809	4.678422	1.408911
1000	1000	700	1	0.01	358.2063	353.6118	4.594524	1.282647
1000	1000	800	1	0.01	382.5282	378.0269	4.501319	1.176729
1000	1000	900	1	0.01	405.3581	400.9581	4.399962	1.085451
1000	1000	1000	1	0.01	427.9206	422.6469	5.273685	1.232398
1000	1000	1100	1	0.01	443.1537	443.2758	-0.12214	-0.02756
1000	1000	1200	1	0.01	461.9539	462.9865	-1.03267	-0.22354
1000	1000	1300	1	0.01	479.9026	481.8916	-1.98907	-0.41447
1000	1000	1400	1	0.01	504.1097	500.0826	4.027103	0.798854
1000	1000	1500	1	0.01	521.485	517.6347	3.850374	0.738348

Bijlage 16: Cilinder met g = (1/k) .

In dit stukje wordt nu een vaste waarde voor g gekozen die afhankelijk van de grondstraal verandert. g= (1/k). verder geldt: E=P=1000 voor alle datapunten.
uit analyse blijkt dat de volgende formule hierbij toegepast kan worden:

$$w := \frac{P}{E \cdot t} \cdot \left(\frac{a}{(t \cdot k)^b} \right);$$

waarbij :
a=0.4409
b=1.2457

P	E	k	w (ANSYS)	formule	residual	%error	abs residual
1000	1000	0.0005	5709.8	5710.696	-0.89648	-0.0157	0.89648259
1000	1000	0.0006	4547.9011	4549.457	-1.55639	-0.03422	1.55639081
1000	1000	0.0007	3760.7835	3753.92	6.863268	0.182496	6.86326845
1000	1000	0.0008	3173.8377	3178.162	-4.32458	-0.13626	4.32458182
1000	1000	0.0009	2750.1111	2744.069	6.041956	0.219699	6.04195609
1000	1000	0.001	2400.5927	2406.251	-5.65856	-0.23572	5.65855867
1000	1000	0.0015	1449.2478	1451.364	-2.11641	-0.14603	2.1164074
1000	1000	0.002	1014.3819	1013.895	0.487226	0.048032	0.48722626
1000	1000	0.0025	764.82437	767.6403	-2.81591	-0.36818	2.81591286
1000	1000	0.003	613.15069	611.5448	1.605873	0.261905	1.60587305
1000	1000	0.0035	504.03132	504.6075	-0.5762	-0.11432	0.57619576
1000	1000	0.004	426.39946	427.2133	-0.81382	-0.19086	0.81382442
1000	1000	0.0045	367.8782	368.8618	-0.98363	-0.26738	0.98363355
1000	1000	0.005	324.20404	323.4519	0.752184	0.23201	0.75218444
1000	1000	0.0055	287.09416	287.2089	-0.11478	-0.03998	0.11478333
1000	1000	0.006	259.18464	257.6797	1.504956	0.58065	1.50495563
1000	1000	0.0065	234.02944	233.204	0.825424	0.352701	0.8254243
1000	1000	0.007	213.40545	212.6207	0.78472	0.367713	0.78472002
1000	1000	0.0075	195.93131	195.0945	0.836787	0.427082	0.83678675
1000	1000	0.008	181.24956	180.01	1.239557	0.683895	1.23955707
1000	1000	0.0085	168.39676	166.9043	1.492421	0.886253	1.49242113
1000	1000	0.009	156.3436	155.4231	0.920484	0.588757	0.92048429
1000	1000	0.0095	146.06939	145.2906	0.778791	0.533165	0.77879062
1000	1000	0.01	137.21393	136.2892	0.9247	0.673911	0.92470027

Bijlage 17: cilinder met g-(1/2k)

Uit analyse blijkt dat de volgende formule hierbij toegepast kan worden:

$$w := \frac{P}{E \cdot t} \cdot \left(\frac{a}{(t \cdot k)^b} \right);$$

waarbij :

a=0.3024

b=1.2496

P	E	k	w (calc)	w (formule)	residual	% error	abs residual
1000	1000	0.0005	4026.311	4033.524049	-7.21295925	-0.17915	7.21295925
1000	1000	0.0006	3220.3399	3211.708897	8.63103314	0.268016	8.63103314
1000	1000	0.0007	2653.6165	2648.966283	4.65026737	0.175243	4.65026737
1000	1000	0.0008	2240.8106	2241.852646	-1.0420357	-0.0465	1.0420357
1000	1000	0.0009	1933.8066	1935.015961	-1.20928132	-0.06253	1.20928132
1000	1000	0.001	1696.4475	1696.304899	0.14262072	0.008407	0.14262072
1000	1000	0.0015	1021.7091	1022.003289	-0.29411883	-0.02879	0.29411883
1000	1000	0.002	707.69445	713.3837003	-5.68925025	-0.80391	5.68925025
1000	1000	0.0025	531.7329	539.7840345	-8.05113448	-1.51413	8.05113448
1000	1000	0.003	429.21534	429.8050947	-0.58975469	-0.1374	0.58975469
1000	1000	0.0035	354.08722	354.4963882	-0.40916821	-0.11556	0.40916821
1000	1000	0.004	300.59851	300.0146401	0.58386994	0.194236	0.58386994
1000	1000	0.0045	259.42909	258.9523974	0.47669264	0.183747	0.47669264
1000	1000	0.005	227.96675	227.0070269	0.95972313	0.420993	0.95972313
1000	1000	0.0055	201.85356	201.5176659	0.33589412	0.166405	0.33589412
1000	1000	0.006	182.95262	180.7552103	2.19740968	1.201081	2.19740968
1000	1000	0.0065	164.12095	163.5499894	0.57096058	0.34789	0.57096058
1000	1000	0.007	150.78393	149.0840151	1.69991494	1.127385	1.69991494
1000	1000	0.0075	138.26219	136.7690019	1.49318807	1.079968	1.49318807
1000	1000	0.008	128.05194	126.17163	1.88031004	1.468396	1.88031004
1000	1000	0.0085	119.43946	116.9660645	2.47339548	2.070836	2.47339548
1000	1000	0.009	110.58775	108.902839	1.68491095	1.523596	1.68491095
1000	1000	0.0095	103.76732	101.7879012	1.97941882	1.907555	1.97941882
1000	1000	0.01	97.02599	95.46816311	1.55782689	1.605577	1.55782689

Bijlage 18: cilinder met g=(1/4k)

Uit analyse blijkt dat de volgende formule hierbij toegepast kan worden:

$$w := \frac{P}{E \cdot t} \cdot \left(\frac{a}{(t \cdot k)^b} \right);$$

waarbij :

a=0.1956

b=1.2607

De fouten hier zijn echter wel groot (maximaal 15 %) omdat de cilinder nu erg plat is.

k	w(ANSYS)	w (calc)	residual	% error	abs residual
0.0005	2842.35448	2838.700221	3.654259	0.128565	3.654259302
0.0006	2249.53691	2255.750263	-6.21335	-0.27621	6.21335277
0.0007	1848.28068	1857.32203	-9.04135	-0.48918	9.041349676
0.0008	1566.63634	1569.54332	-2.90698	-0.18556	2.906980108
0.0009	1360.75036	1352.951642	7.798718	0.573119	7.798718327
0.001	1189.80646	1184.658239	5.148221	0.432694	5.14822109
0.0015	721.21376	710.5331364	10.68062	1.480923	10.68062359
0.002	504.36098	494.3865269	9.974453	1.977642	9.974453101
0.0025	381.24875	373.1525373	8.096213	2.123604	8.096212702
0.003	303.51141	296.5226578	6.988752	2.302632	6.988752227
0.0035	244.56332	244.1485096	0.41481	0.169613	0.414810446
0.004	204.10108	206.3194514	-2.21837	-1.0869	2.218371426
0.0045	172.62524	177.8480638	-5.22282	-3.02553	5.22282379
0.005	149.98658	155.7255763	-5.739	-3.82634	5.738996254
0.0055	132.26677	138.0936542	-5.82688	-4.4054	5.826884237
0.006	115.41091	123.7460747	-8.33516	-7.22216	8.335164698
0.0065	103.05321	111.8677165	-8.81451	-8.55335	8.814506485
0.007	93.77555	101.8890763	-8.11353	-8.65207	8.113526293
0.0075	85.98949	93.40093073	-7.41144	-8.61901	7.411440733
0.008	78.28328	86.10209567	-7.81882	-9.98785	7.818815669
0.0085	72.72277	79.76626559	-7.0435	-9.68541	7.043495585
0.009	66.28993	74.2202972	-7.93037	-11.9632	7.9303672
0.0095	62.0254	69.32959647	-7.3042	-11.7761	7.304196469
0.01	58.58803	64.98804825	-6.40002	-10.9238	6.400018253

Bijlage 19: De invloed van grondstraal bij zadels

g	K1	K2	w	Verschil %
500	0.0005	-0.0005	1535.53277	4.298
600	0.0005	-0.0005	1601.52667	
700	0.0005	-0.0005	1659.09157	2.861
800	0.0005	-0.0005	1706.55717	
900	0.0005	-0.0005	1747.80142	2.07
1000	0.0005	-0.0005	1784.13603	

g	K1	K2	w	Verschil %
500	0.0005	-0.0007	1316.65918	4.18
600	0.0005	-0.0007	1371.67123	
700	0.0005	-0.0007	1420.07093	2.778
800	0.0005	-0.0007	1459.51358	
900	0.0005	-0.0007	1493.66771	2.007
1000	0.0005	-0.0007	1523.64764	

g	K1	K2	w	Verschil %
500	0.0005	-0.001	1106.00353	4.096
600	0.0005	-0.001	1151.30847	
700	0.0005	-0.001	1191.40730	2.71
800	0.0005	-0.001	1223.68228	
900	0.0005	-0.001	1251.50230	1.94
1000	0.0005	-0.001	1275.80769	

g	K1	K2	w	Verschil %
500	0.0005	-0.01	288.03487	3.911
600	0.0005	-0.01	299.30093	
700	0.0005	-0.01	309.61071	2.564
800	0.0005	-0.01	317.54877	
900	0.0005	-0.01	324.18569	1.72
1000	0.0005	-0.01	329.77327	

g	K1	K2	w	Verschil %
500	0.0007	-0.0007	1139.71724	4
600	0.0007	-0.0007	1185.39897	
700	0.0007	-0.0007	1225.99751	2.66
800	0.0007	-0.0007	1258.59090	
900	0.0007	-0.0007	1286.69465	1.91
1000	0.0007	-0.0007	1311.26086	

g	K1	K2	w	Verschil %
500	0.0007	-0.01	262.69712	3.505
600	0.0007	-0.01	271.90346	
700	0.0007	-0.01	280.57133	2.177
800	0.0007	-0.01	286.67812	
900	0.0007	-0.01	291.70435	1.457
1000	0.0007	-0.01	295.95359	

g	K1	K2	w	Verschil %
500	0.01	-0.01	92.99385	1.39
600	0.01	-0.01	94.28681	
700	0.01	-0.01	96.01513	0.98
800	0.01	-0.01	96.95549	
900	0.01	-0.01	97.74490	0.689
1000	0.01	-0.01	98.41805	

K1 = 0.0005 k2= -0.0005 Dikte ‘’t’’ overal ‘’1’’

g = 10*(sqrt(t/k1)) w= 1500.22588

g = 20*(sqrt(t/k1)) w= 1749.06014

g = 30*(sqrt(t/k1)) w= 1884.66234

g = 40*(sqrt(t/k1)) w= 1977.97885

g = 50*(sqrt(t/k1)) w= 2043.54516

g = 60*(sqrt(t/k1)) w= 2093.55868

g = 70*(sqrt(t/k1)) w= 2135.37482

K1 = 0.001 k2= -0.001

g = 10*(sqrt(t/k1)) w= 755.66405

g =20*(sqrt(t/k1)) w= 873.31720

g=30*(sqrt(t/k1))	w=934.3617
g = 40*(sqrt(t/k1))	w= 976.06215
g = 50*(sqrt(t/k1))	w= 1007.6813
g = 60*(sqrt(t/k1))	w= 1028.12836
g = 70*(sqrt(t/k1))	w= 1045.94107

k2= 0.005 k2= -0.005

g = 10*(sqrt(t/k1))	w= 151.67463
g =20*(sqrt(t/k1))	w= 168.82183
g=30*(sqrt(t/k1))	w=180.51153
g = 40*(sqrt(t/k1))	w= 186.55629
g = 50*(sqrt(t/k1))	w= 191.15313
g = 60*(sqrt(t/k1))	w= 194.53246
g = 70*(sqrt(t/k1))	w= 197.14376
g = 80*(sqrt(t/k1))	w= 198.86386

K1 = 0.01 k2= -0.01

g = 10*(sqrt(t/k1))	w= 74.33075
g =20*(sqrt(t/k1))	w= 84.42274
g=30*(sqrt(t/k1))	w= 87.63600
g = 40*(sqrt(t/k1))	w= 91.67441
g = 50*(sqrt(t/k1))	w= 93.19098
g = 60*(sqrt(t/k1))	w= 94.31724
g = 70*(sqrt(t/k1))	w= 96.24112
g = 80*(sqrt(t/k1))	w= 97.05665

Conclusie: De invloed van ‘’g’’ blijft erg groot bij het toepassen van g=1000!
Om deze invloed weg te werken is een g van meer dan 3000 mm nodig bij k1 =0.0005.
(dus ongeveer g=70*(sqrt(t/k1)))

Bijlage 20: Datapunten bij zadels met g- 2/k

P	E	k1	k2	w(ANSYS)	w(calc)	residual	%error
1000	1000	0.0005	-0.0005	2191.99591	2228.745387	-36.74947733	-1.676530378
1000	1000	0.0005	-0.0006	2002.49125	2014.439768	-11.94851846	-0.59668268
1000	1000	0.0005	-0.0007	1851.61625	1849.405514	2.210736233	0.119394947
1000	1000	0.0005	-0.0008	1727.77391	1717.415939	10.3579714	0.599498079
1000	1000	0.0005	-0.0009	1623.75062	1608.834259	14.91636114	0.918636209
1000	1000	0.0005	-0.001	1534.78203	1517.53487	17.24716047	1.123753089
1000	1000	0.0005	-0.002	1040.79524	1033.277329	7.51791127	0.722323756
1000	1000	0.0005	-0.003	818.73899	825.2279325	-6.48894255	-0.792553259
1000	1000	0.0005	-0.004	687.14752	703.5502508	-16.40273081	-2.387075603
1000	1000	0.0005	-0.005	598.30148	621.6677126	-23.36623256	-3.905427839
1000	1000	0.0005	-0.006	533.49977	561.8910846	-28.39131459	-5.321710745
1000	1000	0.0005	-0.007	483.74452	515.8578014	-32.11328138	-6.638479622
1000	1000	0.0005	-0.008	444.11279	479.0417264	-34.92893641	-7.864879642
1000	1000	0.0005	-0.009	411.66065	448.7548552	-37.09420522	-9.010869806
1000	1000	0.0005	-0.01	384.50838	423.2885625	-38.78018245	-10.08565339
1000	1000	0.0006	-0.0005	1964.1892	2014.439768	-50.25056846	-2.55833646
1000	1000	0.0006	-0.0006	1798.9788	1820.740765	-21.76196465	-1.20968433
1000	1000	0.0006	-0.0007	1666.94864	1671.575424	-4.626783608	-0.277560058
1000	1000	0.0006	-0.0008	1558.22405	1552.277342	5.946708066	0.381633698
1000	1000	0.0006	-0.0009	1466.64248	1454.136363	12.50611685	0.852703847
1000	1000	0.0006	-0.001	1388.12152	1371.615891	16.50562858	1.189062221
1000	1000	0.0006	-0.002	949.37311	933.9222662	15.45084383	1.627478562
1000	1000	0.0006	-0.003	749.54969	745.8779163	3.671773742	0.489863953
1000	1000	0.0006	-0.004	630.49185	635.9001851	-5.408335097	-0.857796195
1000	1000	0.0006	-0.005	549.82909	561.8910846	-12.06199459	-2.19377163
1000	1000	0.0006	-0.006	490.85023	507.8622945	-17.01206453	-3.465836113
1000	1000	0.0006	-0.007	445.48013	466.2553542	-20.77522419	-4.663557989
1000	1000	0.0006	-0.008	409.28683	432.9793389	-23.69250892	-5.788729855
1000	1000	0.0006	-0.009	379.61348	405.6047101	-25.99123006	-6.846761623
1000	1000	0.0006	-0.01	354.7604	382.5871356	-27.82673561	-7.843811093
1000	1000	0.0007	-0.0005	1854.23416	1849.405514	4.828646233	0.260411891
1000	1000	0.0007	-0.0006	1666.94864	1671.575424	-4.626783608	-0.277560058
1000	1000	0.0007	-0.0007	1522.28301	1534.630548	-12.34753766	-0.811119718
1000	1000	0.0007	-0.0008	1425.22786	1425.106037	0.121823065	0.00854762
1000	1000	0.0007	-0.0009	1343.27754	1335.00532	8.272219966	0.61582359
1000	1000	0.0007	-0.001	1272.8636	1259.24539	13.61820975	1.069887594
1000	1000	0.0007	-0.002	876.38569	857.4100926	18.97559737	2.165210772

1000	1000	0.0007	-0.003	694.26113	684.7713953	9.489734734	1.366882621
1000	1000	0.0007	-0.004	585.19896	583.8036594	1.395300571	0.238431827
1000	1000	0.0007	-0.005	511.06746	515.8578014	-4.790341382	-0.937320757
1000	1000	0.0007	-0.006	456.73788	466.2553542	-9.517474192	-2.083793486
1000	1000	0.0007	-0.007	414.87009	428.0570888	-13.18699881	-3.178585087
1000	1000	0.0007	-0.008	381.42346	397.5072322	-16.08377218	-4.216775805
1000	1000	0.0007	-0.009	353.97015	372.3752871	-18.40513714	-5.199629726
1000	1000	0.0007	-0.01	330.95406	351.2434421	-20.28938206	-6.130573548
1000	1000	0.0008	-0.0005	1727.77391	1717.415939	10.3579714	0.599498079
1000	1000	0.0008	-0.0006	1559.63467	1552.277342	7.357328066	0.471734068
1000	1000	0.0008	-0.0007	1426.43192	1425.106037	1.325883065	0.092951023
1000	1000	0.0008	-0.0008	1317.31629	1323.398143	-6.081852701	-0.461685075
1000	1000	0.0008	-0.0009	1243.07884	1239.727792	3.351047654	0.269576438
1000	1000	0.0008	-0.001	1179.17157	1169.374746	9.796823507	0.830822567
1000	1000	0.0008	-0.002	816.64477	796.2178917	20.42687834	2.501317475
1000	1000	0.0008	-0.003	648.96192	635.9001851	13.0617349	2.012712071
1000	1000	0.0008	-0.004	548.0743	542.1383803	5.93591972	1.083050185
1000	1000	0.0008	-0.005	479.28958	479.0417264	0.247853593	0.051712702
1000	1000	0.0008	-0.006	428.76823	432.9793389	-4.21110892	-0.982141079
1000	1000	0.0008	-0.007	389.77019	397.5072322	-7.737042177	-1.985026658
1000	1000	0.0008	-0.008	358.5747	369.1376776	-10.56297758	-2.945823444
1000	1000	0.0008	-0.009	332.9412	345.7993655	-12.85816553	-3.861992908
1000	1000	0.0008	-0.01	311.43108	326.1756717	-14.74459171	-4.734463789
1000	1000	0.0009	-0.0005	1622.44037	1608.834259	13.60611114	0.838620105
1000	1000	0.0009	-0.0006	1466.63874	1454.136363	12.50237685	0.852451017
1000	1000	0.0009	-0.0007	1344.09363	1335.00532	9.088309966	0.676166434
1000	1000	0.0009	-0.0008	1244.99491	1239.727792	5.267117654	0.423063389
1000	1000	0.0009	-0.0009	1160.33651	1161.347405	-1.010895233	-0.087120867
1000	1000	0.0009	-0.001	1101.43601	1095.442351	5.993658889	0.54416769
1000	1000	0.0009	-0.002	767.24355	745.8779163	21.36563374	2.784726407
1000	1000	0.0009	-0.003	611.45838	595.6961153	15.76226468	2.577814811
1000	1000	0.0009	-0.004	517.32509	507.8622945	9.462795469	1.829177755
1000	1000	0.0009	-0.005	452.96453	448.7548552	4.209674784	0.929360801
1000	1000	0.0009	-0.006	405.59687	405.6047101	-0.007840065	-0.00193297
1000	1000	0.0009	-0.007	368.9766	372.3752871	-3.398687139	-0.921111837
1000	1000	0.0009	-0.008	339.64699	345.7993655	-6.152375532	-1.811402931
1000	1000	0.0009	-0.009	315.52225	323.9365919	-8.414341864	-2.666798257
1000	1000	0.0009	-0.01	295.26094	305.5535839	-10.29264388	-3.485948356
1000	1000	0.001	-0.0005	1534.78204	1517.53487	17.24717047	1.123753733
1000	1000	0.001	-0.0006	1389.32446	1371.615891	17.70856858	1.274617203
1000	1000	0.001	-0.0007	1273.89108	1259.24539	14.64568975	1.149681474

1000	1000	0.001	-0.0008	1179.22167	1169.374746	9.846923507	0.835035834
1000	1000	0.001	-0.0009	1097.16668	1095.442351	1.724328889	0.157161981
1000	1000	0.001	-0.001	1034.54871	1033.277329	1.27138127	0.122892355
1000	1000	0.001	-0.002	724.59562	703.5502508	21.04536919	2.904429534
1000	1000	0.001	-0.003	579.04784	561.8910846	17.15675541	2.96292538
1000	1000	0.001	-0.004	490.73929	479.0417264	11.69756359	2.383661515
1000	1000	0.001	-0.005	430.19795	423.2885625	6.909387547	1.606094949
1000	1000	0.001	-0.006	385.5543	382.5871356	2.967164391	0.769584049
1000	1000	0.001	-0.007	350.98851	351.2434421	-0.254932058	-0.072632594
1000	1000	0.001	-0.008	323.27145	326.1756717	-2.90422171	-0.898384844
1000	1000	0.001	-0.009	300.45081	305.5535839	-5.102773883	-1.698372483
1000	1000	0.001	-0.01	281.26902	288.2137893	-6.944769268	-2.469084319
1000	1000	0.002	-0.0005	1042.74472	1033.277329	9.46739127	0.907929917
1000	1000	0.002	-0.0006	948.63694	933.9222662	14.71467383	1.551138609
1000	1000	0.002	-0.0007	876.3857	857.4100926	18.97560737	2.165211889
1000	1000	0.002	-0.0008	816.47118	796.2178917	20.25328834	2.480588272
1000	1000	0.002	-0.0009	767.46304	745.8779163	21.58512374	2.812529414
1000	1000	0.002	-0.001	724.80754	703.5502508	21.25728919	2.932818441
1000	1000	0.002	-0.002	487.50788	479.0417264	8.466153593	1.73661882
1000	1000	0.002	-0.003	397.8035	382.5871356	15.21636439	3.825095654
1000	1000	0.002	-0.004	341.67289	326.1756717	15.49721829	4.535688591
1000	1000	0.002	-0.005	302.37356	288.2137893	14.15977073	4.682873308
1000	1000	0.002	-0.006	272.94142	260.500514	12.44090602	4.558086502
1000	1000	0.002	-0.007	249.87806	239.1588443	10.71921572	4.289778672
1000	1000	0.002	-0.008	231.2051	222.0904004	9.114699622	3.942257165
1000	1000	0.002	-0.009	215.70787	208.0489861	7.658883925	3.550581592
1000	1000	0.002	-0.01	202.59384	196.2424589	6.35138109	3.135031692
1000	1000	0.003	-0.0005	818.73903	825.2279325	-6.48890255	-0.792548335
1000	1000	0.003	-0.0006	749.54972	745.8779163	3.671803742	0.489867936
1000	1000	0.003	-0.0007	694.40813	684.7713953	9.636734734	1.387762372
1000	1000	0.003	-0.0008	648.98713	635.9001851	13.0869449	2.016518402
1000	1000	0.003	-0.0009	608.47574	595.6961153	12.77962468	2.100268564
1000	1000	0.003	-0.001	578.92947	561.8910846	17.03838541	2.943084831
1000	1000	0.003	-0.002	397.35151	382.5871356	14.76437439	3.715696057
1000	1000	0.003	-0.003	313.07091	305.5535839	7.517326117	2.401157654
1000	1000	0.003	-0.004	271.52822	260.500514	11.02770602	4.061348034
1000	1000	0.003	-0.005	242.0016	230.18222	11.81937995	4.884009012
1000	1000	0.003	-0.006	219.63436	208.0489861	11.58537393	5.274845851
1000	1000	0.003	-0.007	201.94778	191.004441	10.94333896	5.4188954
1000	1000	0.003	-0.008	187.52183	177.3727119	10.1491181	5.412232858
1000	1000	0.003	-0.009	175.47514	166.1585229	9.316617139	5.309365839

1000	1000	0.003	-0.01	165.22728	156.7292286	8.498051416	5.143249599
1000	1000	0.004	-0.0005	687.14757	703.5502508	-16.40268081	-2.387068153
1000	1000	0.004	-0.0006	630.49188	635.9001851	-5.408305097	-0.857791396
1000	1000	0.004	-0.0007	585.31993	583.8036594	1.516270571	0.259049879
1000	1000	0.004	-0.0008	548.0955	542.1383803	5.95711972	1.086876232
1000	1000	0.004	-0.0009	514.6335	507.8622945	6.771205469	1.315733521
1000	1000	0.004	-0.001	490.64241	479.0417264	11.60068359	2.36438664
1000	1000	0.004	-0.002	341.22907	326.1756717	15.05339829	4.411522819
1000	1000	0.004	-0.003	271.40778	260.500514	10.90726602	4.018774268
1000	1000	0.004	-0.004	228.86794	222.0904004	6.777539622	2.961332034
1000	1000	0.004	-0.005	205.13876	196.2424589	8.89630109	4.336723635
1000	1000	0.004	-0.006	187.00097	177.3727119	9.628258098	5.148774415
1000	1000	0.004	-0.007	172.55468	162.8413401	9.713339931	5.629137344
1000	1000	0.004	-0.008	160.70092	151.2195734	9.481346567	5.899995201
1000	1000	0.004	-0.009	150.752	141.658887	9.093113016	6.031835741
1000	1000	0.004	-0.01	142.2518	133.6199173	8.631882726	6.068030581
1000	1000	0.005	-0.0005	598.30154	621.6677126	-23.36617256	-3.905417419
1000	1000	0.005	-0.0006	549.82913	561.8910846	-12.06195459	-2.193764195
1000	1000	0.005	-0.0007	511.17167	515.8578014	-4.686131382	-0.916743172
1000	1000	0.005	-0.0008	479.30811	479.0417264	0.266383593	0.055576692
1000	1000	0.005	-0.0009	450.48527	448.7548552	1.730414784	0.38412239
1000	1000	0.005	-0.001	430.11484	423.2885625	6.826277547	1.587082544
1000	1000	0.005	-0.002	301.94428	288.2137893	13.73049073	4.547359113
1000	1000	0.005	-0.003	242.0016	230.18222	11.81937995	4.884009012
1000	1000	0.005	-0.004	205.2966	196.2424589	9.05414109	4.410273278
1000	1000	0.005	-0.005	179.52925	173.4028243	6.126425684	3.412494445
1000	1000	0.005	-0.006	164.16235	156.7292286	7.433121416	4.527908754
1000	1000	0.005	-0.007	151.94012	143.8890872	8.051032795	5.298819558
1000	1000	0.005	-0.008	141.86062	133.6199173	8.240702726	5.809013612
1000	1000	0.005	-0.009	133.36446	125.1719492	8.192510826	6.142949048
1000	1000	0.005	-0.01	126.07848	118.0685932	8.009886848	6.353095983
1000	1000	0.006	-0.0005	533.49984	561.8910846	-28.39124459	-5.321696926
1000	1000	0.006	-0.0006	490.85028	507.8622945	-17.01201453	-3.465825573
1000	1000	0.006	-0.0007	456.83026	466.2553542	-9.425094192	-2.06315015
1000	1000	0.006	-0.0008	428.78482	432.9793389	-4.19451892	-0.978234006
1000	1000	0.006	-0.0009	403.28273	405.6047101	-2.321980065	-0.575769774
1000	1000	0.006	-0.001	385.48087	382.5871356	2.893734391	0.750681711
1000	1000	0.006	-0.002	272.52797	260.500514	12.02745602	4.41329234
1000	1000	0.006	-0.003	219.63436	208.0489861	11.58537393	5.274845851
1000	1000	0.006	-0.004	187.13709	177.3727119	9.764378098	5.217767412
1000	1000	0.006	-0.005	164.25408	156.7292286	7.524851416	4.581226485

1000	1000	0.006	-0.006	147.1446	141.658887	5.485713016	3.728110319
1000	1000	0.006	-0.007	136.55208	130.0533929	6.498687109	4.759127147
1000	1000	0.006	-0.008	127.77803	120.7716578	7.006372212	5.483236995
1000	1000	0.006	-0.009	120.35432	113.1360064	7.218313642	5.997552595
1000	1000	0.006	-0.01	113.96717	106.7156755	7.251494534	6.36279249
1000	1000	0.007	-0.0005	483.7446	515.8578014	-32.11320138	-6.638461986
1000	1000	0.007	-0.0006	445.48019	466.2553542	-20.77516419	-4.663543892
1000	1000	0.007	-0.0007	414.95362	428.0570888	-13.10346881	-3.157815278
1000	1000	0.007	-0.0008	389.78528	397.5072322	-7.721952177	-1.981078448
1000	1000	0.007	-0.0009	366.79511	372.3752871	-5.580177139	-1.521333569
1000	1000	0.007	-0.001	350.92229	351.2434421	-0.321152058	-0.091516574
1000	1000	0.007	-0.002	249.48015	239.1588443	10.32130572	4.137125028
1000	1000	0.007	-0.003	202.10437	191.004441	11.09992896	5.492176622
1000	1000	0.007	-0.004	172.55468	162.8413401	9.713339931	5.629137344
1000	1000	0.007	-0.005	152.00402	143.8890872	8.114932795	5.338630383
1000	1000	0.007	-0.006	136.55859	130.0533929	6.505197109	4.763667455
1000	1000	0.007	-0.007	124.35472	119.3986863	4.956033744	3.985400589
1000	1000	0.007	-0.008	116.59871	110.8773632	5.721346816	4.906869738
1000	1000	0.007	-0.009	110.01406	103.8672673	6.146792663	5.587279174
1000	1000	0.007	-0.01	104.33204	97.97292612	6.359113878	6.095072883
1000	1000	0.008	-0.0005	444.11288	479.0417264	-34.92884641	-7.864857783
1000	1000	0.008	-0.0006	409.28689	432.9793389	-23.69244892	-5.788714346
1000	1000	0.008	-0.0007	381.50007	397.5072322	-16.00716218	-4.195847769
1000	1000	0.008	-0.0008	358.58859	369.1376776	-10.54908758	-2.941835817
1000	1000	0.008	-0.0009	337.57258	345.7993655	-8.226785532	-2.437041993
1000	1000	0.008	-0.001	323.56065	326.1756717	-2.61502171	-0.808201402
1000	1000	0.008	-0.002	231.20511	222.0904004	9.114709622	3.94226132
1000	1000	0.008	-0.003	187.52184	177.3727119	10.1491281	5.412237902
1000	1000	0.008	-0.004	160.80906	151.2195734	9.589486567	5.963275059
1000	1000	0.008	-0.005	141.86062	133.6199173	8.240702726	5.809013612
1000	1000	0.008	-0.006	127.84241	120.7716578	7.070752212	5.530834574
1000	1000	0.008	-0.007	116.65632	110.8773632	5.778956816	4.953830891
1000	1000	0.008	-0.008	107.57574	102.9641954	4.611544563	4.286788604
1000	1000	0.008	-0.009	101.65815	96.45440067	5.203749332	5.118870776
1000	1000	0.008	-0.01	96.53834	90.98073063	5.55760937	5.756893448
1000	1000	0.009	-0.0005	411.66074	448.7548552	-37.09411522	-9.010845974
1000	1000	0.009	-0.0006	379.61355	405.6047101	-25.99116006	-6.846741921
1000	1000	0.009	-0.0007	354.04118	372.3752871	-18.33410714	-5.178523905
1000	1000	0.009	-0.0008	332.95409	345.7993655	-12.84527553	-3.85797199
1000	1000	0.009	-0.0009	313.55254	323.9365919	-10.38405186	-3.311742225
1000	1000	0.009	-0.001	300.73288	305.5535839	-4.820703883	-1.602985308

1000	1000	0.009	-0.002	215.70788	208.0489861	7.658893925	3.550586063
1000	1000	0.009	-0.003	175.55267	166.1585229	9.394147139	5.351184427
1000	1000	0.009	-0.004	150.88688	141.658887	9.227993016	6.115835264
1000	1000	0.009	-0.005	133.36446	125.1719492	8.192510826	6.142949048
1000	1000	0.009	-0.006	120.41308	113.1360064	7.277073642	6.043424553
1000	1000	0.009	-0.007	110.06665	103.8672673	6.199382663	5.632389705
1000	1000	0.009	-0.008	101.69233	96.45440067	5.237929332	5.150761451
1000	1000	0.009	-0.009	94.61596	90.35618031	4.259779691	4.502178798
1000	1000	0.009	-0.01	89.96482	85.22857687	4.736243134	5.264550225
1000	1000	0.01	-0.0005	384.50848	423.2885625	-38.78008245	-10.08562476
1000	1000	0.01	-0.0006	354.76047	382.5871356	-27.82666561	-7.843789814
1000	1000	0.01	-0.0007	331.02048	351.2434421	-20.22296206	-6.109278211
1000	1000	0.01	-0.0008	311.44314	326.1756717	-14.73253171	-4.730408161
1000	1000	0.01	-0.0009	293.35728	305.5535839	-12.19630388	-4.157491467
1000	1000	0.01	-0.001	281.21662	288.2137893	-6.997169268	-2.488177715
1000	1000	0.01	-0.002	202.23727	196.2424589	5.99481109	2.964246447
1000	1000	0.01	-0.003	165.08833	156.7292286	8.359101416	5.063411457
1000	1000	0.01	-0.004	142.10996	133.6199173	8.490042726	5.97427705
1000	1000	0.01	-0.005	126.07187	118.0685932	8.003276848	6.348186037
1000	1000	0.01	-0.006	114.02138	106.7156755	7.305704534	6.407311097
1000	1000	0.01	-0.007	104.38058	97.97292612	6.407653878	6.1387414
1000	1000	0.01	-0.008	96.57014	90.98073063	5.58940937	5.787927169
1000	1000	0.01	-0.009	90.06141	85.22857687	4.832833134	5.366153088
1000	1000	0.01	-0.01	84.41922	80.39195869	4.027261312	4.770550252

Bijlage 21: Datapunten bij zadels met g=1/k

P	E	k1	k2	w(ANSYS)	w calc	residual	error %
1000	1000	0.0005	-0.0005	2010.3968	2043.997	-33.6004	-1.67133
1000	1000	0.0005	-0.0006	1842.3958	1848.786	-6.39011	-0.34684
1000	1000	0.0005	-0.0007	1707.8262	1698.356	9.470221	0.554519
1000	1000	0.0005	-0.0008	1596.8272	1577.978	18.84922	1.180417
1000	1000	0.0005	-0.0009	1503.2152	1478.899	24.31571	1.61758
1000	1000	0.0005	-0.001	1423.4294	1395.554	27.87548	1.958333
1000	1000	0.0005	-0.002	972.58221	952.8245	19.75768	2.031466
1000	1000	0.0005	-0.003	767.40482	762.193	5.211845	0.679152
1000	1000	0.0005	-0.004	645.0782	650.5479	-5.46965	-0.84791
1000	1000	0.0005	-0.005	562.17605	575.3405	-13.1644	-2.34169
1000	1000	0.0005	-0.006	501.5517	520.3928	-18.8411	-3.75656
1000	1000	0.0005	-0.007	454.91414	478.05	-23.1359	-5.08577
1000	1000	0.0005	-0.008	417.71076	444.1663	-26.4555	-6.33345
1000	1000	0.0005	-0.009	387.21143	416.2778	-29.0664	-7.50659
1000	1000	0.0005	-0.01	361.66912	392.8179	-31.1488	-8.6125
1000	1000	0.0006	-0.0005	1795.8692	1848.786	-52.9167	-2.94658
1000	1000	0.0006	-0.0006	1650.3809	1672.218	-21.8374	-1.32317
1000	1000	0.0006	-0.0007	1533.3457	1536.155	-2.80937	-0.18322
1000	1000	0.0006	-0.0008	1436.4582	1427.274	9.184489	0.639384
1000	1000	0.0006	-0.0009	1354.4896	1337.658	16.83192	1.242677
1000	1000	0.0006	-0.001	1282.9348	1262.272	20.66274	1.610584
1000	1000	0.0006	-0.002	884.08736	861.8254	22.262	2.518077
1000	1000	0.0006	-0.003	700.41857	689.4	11.01857	1.57314
1000	1000	0.0006	-0.004	590.2413	588.4175	1.823789	0.30899
1000	1000	0.0006	-0.005	515.27936	520.3928	-5.11342	-0.99236
1000	1000	0.0006	-0.006	460.30777	470.6928	-10.3851	-2.25612
1000	1000	0.0006	-0.007	417.92823	432.394	-14.4658	-3.46131
1000	1000	0.0006	-0.008	384.0637	401.7463	-17.6826	-4.60409
1000	1000	0.0006	-0.009	356.26248	376.5214	-20.2589	-5.6865
1000	1000	0.0006	-0.01	332.95223	355.3019	-22.3497	-6.71259
1000	1000	0.0007	-0.0005	1626.3719	1698.356	-71.984	-4.42605
1000	1000	0.0007	-0.0006	1498.3315	1536.155	-37.8236	-2.52438
1000	1000	0.0007	-0.0007	1394.9432	1411.163	-16.2197	-1.16275
1000	1000	0.0007	-0.0008	1309.0772	1311.141	-2.06367	-0.15764
1000	1000	0.0007	-0.0009	1236.2292	1228.817	7.412564	0.599611
1000	1000	0.0007	-0.001	1171.8445	1159.565	12.27967	1.047892
1000	1000	0.0007	-0.002	813.95906	791.7013	22.25777	2.734507

1000	1000	0.0007	-0.003	647.33848	633.3057	14.03282	2.167772
1000	1000	0.0007	-0.004	546.80678	540.5398	6.266983	1.146106
1000	1000	0.0007	-0.005	478.1518	478.05	0.101774	0.021285
1000	1000	0.0007	-0.006	427.67076	432.394	-4.72327	-1.10442
1000	1000	0.0007	-0.007	388.67373	397.2115	-8.53773	-2.19663
1000	1000	0.0007	-0.008	357.46132	369.0575	-11.5961	-3.24403
1000	1000	0.0007	-0.009	331.80306	345.885	-14.0819	-4.24406
1000	1000	0.0007	-0.01	310.26538	326.3921	-16.1267	-5.19772
1000	1000	0.0008	-0.0005	1596.891	1577.978	18.91303	1.184366
1000	1000	0.0008	-0.0006	1434.7148	1427.274	7.441089	0.518646
1000	1000	0.0008	-0.0007	1309.0772	1311.141	-2.06367	-0.15764
1000	1000	0.0008	-0.0008	1205.2486	1218.208	-12.9598	-1.07528
1000	1000	0.0008	-0.0009	1205.2486	1141.719	63.52942	5.271063
1000	1000	0.0008	-0.001	1082.4641	1077.376	5.088216	0.470059
1000	1000	0.0008	-0.002	757.06896	735.5862	21.48275	2.837622
1000	1000	0.0008	-0.003	604.11453	588.4175	15.69702	2.598352
1000	1000	0.0008	-0.004	511.35123	502.2268	9.124416	1.784374
1000	1000	0.0008	-0.005	447.78992	444.1663	3.623657	0.809232
1000	1000	0.0008	-0.006	400.94263	401.7463	-0.80369	-0.20045
1000	1000	0.0008	-0.007	364.6868	369.0575	-4.37066	-1.19847
1000	1000	0.0008	-0.008	335.62628	342.899	-7.27272	-2.16691
1000	1000	0.0008	-0.009	311.70849	321.369	-9.66046	-3.0992
1000	1000	0.0008	-0.01	291.61167	303.2577	-11.6461	-3.99369
1000	1000	0.0009	-0.0005	1503.8079	1478.899	24.90846	1.656359
1000	1000	0.0009	-0.0006	1353.3992	1337.658	15.74156	1.163113
1000	1000	0.0009	-0.0007	1235.6966	1228.817	6.879984	0.55677
1000	1000	0.0009	-0.0008	1138.4208	1141.719	-3.29841	-0.28974
1000	1000	0.0009	-0.0009	1057.7141	1070.033	-12.3184	-1.16463
1000	1000	0.0009	-0.001	1006.9062	1009.729	-2.82311	-0.28037
1000	1000	0.0009	-0.002	708.8909	689.4	19.4909	2.749492
1000	1000	0.0009	-0.003	567.51796	551.4718	16.04618	2.827431
1000	1000	0.0009	-0.004	481.34872	470.6928	10.65587	2.213753
1000	1000	0.0009	-0.005	422.11297	416.2778	5.83515	1.382367
1000	1000	0.0009	-0.006	378.35152	376.5214	1.830166	0.483721
1000	1000	0.0009	-0.007	344.42325	345.885	-1.46173	-0.4244
1000	1000	0.0009	-0.008	317.18958	321.369	-4.17937	-1.31763
1000	1000	0.0009	-0.009	294.74909	301.1907	-6.44166	-2.18547
1000	1000	0.0009	-0.01	275.87503	284.2167	-8.34167	-3.02371
1000	1000	0.001	-0.0005	1423.4294	1395.554	27.87549	1.958333
1000	1000	0.001	-0.0006	1282.9348	1262.272	20.66275	1.610585
1000	1000	0.001	-0.0007	1172.8874	1159.565	13.32254	1.135875

1000	1000	0.001	-0.0008	1081.8606	1077.376	4.484736	0.414539
1000	1000	0.001	-0.0009	1006.1947	1009.729	-3.53466	-0.35129
1000	1000	0.001	-0.001	943.22145	952.8245	-9.60308	-1.01812
1000	1000	0.001	-0.002	668.17798	650.5479	17.63013	2.638537
1000	1000	0.001	-0.003	536.58456	520.3928	16.19178	3.017564
1000	1000	0.001	-0.004	455.99592	444.1663	11.82966	2.594246
1000	1000	0.001	-0.005	400.42417	392.8179	7.606297	1.89956
1000	1000	0.001	-0.006	359.27754	355.3019	3.9756	1.106554
1000	1000	0.001	-0.007	327.32184	326.3921	0.92972	0.284039
1000	1000	0.001	-0.008	301.63643	303.2577	-1.6213	-0.5375
1000	1000	0.001	-0.009	280.44794	284.2167	-3.76876	-1.34384
1000	1000	0.001	-0.01	262.61007	268.1992	-5.58918	-2.12832
1000	1000	0.002	-0.0005	972.58223	952.8245	19.7577	2.031468
1000	1000	0.002	-0.0006	884.08738	861.8254	22.26202	2.518079
1000	1000	0.002	-0.0007	814.487	791.7013	22.78571	2.797553
1000	1000	0.002	-0.0008	756.69386	735.5862	21.10765	2.789457
1000	1000	0.002	-0.0009	708.1013	689.4	18.7013	2.641048
1000	1000	0.002	-0.001	595.54913	650.5479	-54.9987	-9.23496
1000	1000	0.002	-0.002	440.78595	444.1663	-3.38031	-0.76688
1000	1000	0.002	-0.003	362.89139	355.3019	7.58945	2.091383
1000	1000	0.002	-0.004	313.05642	303.2577	9.798685	3.130006
1000	1000	0.002	-0.005	277.84553	268.1992	9.64628	3.471814
1000	1000	0.002	-0.006	251.30592	242.585	8.720945	3.470251
1000	1000	0.002	-0.007	230.4092	222.8466	7.562615	3.282254
1000	1000	0.002	-0.008	213.42697	207.0514	6.375554	2.98723
1000	1000	0.002	-0.009	199.29046	194.051	5.239449	2.629052
1000	1000	0.002	-0.01	187.29831	183.115	4.183328	2.233511
1000	1000	0.003	-0.0005	767.40486	762.193	5.211885	0.679157
1000	1000	0.003	-0.0006	700.41859	689.4	11.01859	1.573143
1000	1000	0.003	-0.0007	647.67591	633.3057	14.37025	2.218742
1000	1000	0.003	-0.0008	603.83227	588.4175	15.41476	2.552821
1000	1000	0.003	-0.0009	566.75005	551.4718	15.27827	2.695769
1000	1000	0.003	-0.001	442.00148	520.3928	-78.3913	-17.7355
1000	1000	0.003	-0.002	337.90027	355.3019	-17.4017	-5.14994
1000	1000	0.003	-0.003	282.47436	284.2167	-1.74234	-0.61681
1000	1000	0.003	-0.004	246.37521	242.585	3.790235	1.5384
1000	1000	0.003	-0.005	220.41079	214.5406	5.870151	2.663277
1000	1000	0.003	-0.006	200.5777	194.051	6.526689	3.253945
1000	1000	0.003	-0.007	184.7972	178.2617	6.53552	3.53659
1000	1000	0.003	-0.008	171.86345	165.6266	6.2368	3.628928
1000	1000	0.003	-0.009	161.02069	155.2272	5.793455	3.597957

1000	1000	0.003	-0.01	151.76735	146.4792	5.288174	3.484395
1000	1000	0.004	-0.0005	645.07825	650.5479	-5.4696	-0.8479
1000	1000	0.004	-0.0006	590.24134	588.4175	1.823829	0.308997
1000	1000	0.004	-0.0007	547.04542	540.5398	6.505623	1.189229
1000	1000	0.004	-0.0008	511.12059	502.2268	8.893776	1.740054
1000	1000	0.004	-0.0009	480.61478	470.6928	9.921931	2.064425
1000	1000	0.004	-0.001	456.18364	444.1663	12.01738	2.634329
1000	1000	0.004	-0.002	313.97828	303.2577	10.72055	3.414422
1000	1000	0.004	-0.003	246.3097	242.585	3.724725	1.512212
1000	1000	0.004	-0.004	205.43799	207.0514	-1.61343	-0.78536
1000	1000	0.004	-0.005	177.66977	183.115	-5.44521	-3.06479
1000	1000	0.004	-0.006	169.41254	165.6266	3.78589	2.234717
1000	1000	0.004	-0.007	156.71775	152.1501	4.567629	2.914557
1000	1000	0.004	-0.008	146.2389	141.3659	4.873045	3.332249
1000	1000	0.004	-0.009	137.40165	132.4897	4.911916	3.574859
1000	1000	0.004	-0.01	129.82127	125.0231	4.798189	3.695996
1000	1000	0.005	-0.0005	562.17611	575.3405	-13.1644	-2.34168
1000	1000	0.005	-0.0006	515.27941	520.3928	-5.11337	-0.99235
1000	1000	0.005	-0.0007	478.33032	478.05	0.280294	0.058599
1000	1000	0.005	-0.0008	447.59252	444.1663	3.426257	0.765486
1000	1000	0.005	-0.0009	421.41252	416.2778	5.1347	1.21845
1000	1000	0.005	-0.001	400.42417	392.8179	7.606297	1.89956
1000	1000	0.005	-0.002	277.79808	268.1992	9.59883	3.455326
1000	1000	0.005	-0.003	220.89406	214.5406	6.353421	2.87623
1000	1000	0.005	-0.004	185.609	183.115	2.494018	1.343695
1000	1000	0.005	-0.005	160.83407	161.9457	-1.11168	-0.6912
1000	1000	0.005	-0.006	147.85816	146.4792	1.378984	0.93264
1000	1000	0.005	-0.007	137.25479	134.5606	2.694172	1.962898
1000	1000	0.005	-0.008	128.44852	125.0231	3.425439	2.66678
1000	1000	0.005	-0.009	120.98323	117.1731	3.810135	3.149309
1000	1000	0.005	-0.01	114.55107	110.5696	3.981437	3.475687
1000	1000	0.006	-0.0005	501.55177	520.3928	-18.841	-3.75654
1000	1000	0.006	-0.0006	460.30782	470.6928	-10.385	-2.25611
1000	1000	0.006	-0.0007	427.80907	432.394	-4.58496	-1.07173
1000	1000	0.006	-0.0008	400.76859	401.7463	-0.97773	-0.24396
1000	1000	0.006	-0.0009	377.6816	376.5214	1.160246	0.307202
1000	1000	0.006	-0.001	359.52618	355.3019	4.22424	1.174946
1000	1000	0.006	-0.002	250.8627	242.585	8.277725	3.299703
1000	1000	0.006	-0.003	201.49314	194.051	7.442129	3.69349
1000	1000	0.006	-0.004	169.3824	165.6266	3.75575	2.21732
1000	1000	0.006	-0.005	142.52882	146.4792	-3.95036	-2.77162

1000	1000	0.006	-0.006	131.4213	132.4897	-1.06843	-0.81298
1000	1000	0.006	-0.007	122.3792	121.7095	0.669746	0.547271
1000	1000	0.006	-0.008	114.82772	113.0828	1.744924	1.519602
1000	1000	0.006	-0.009	108.39582	105.9825	2.4133	2.226378
1000	1000	0.006	-0.01	102.83126	100.0097	2.821541	2.743855
1000	1000	0.007	-0.0005	454.91422	478.05	-23.1358	-5.08575
1000	1000	0.007	-0.0006	417.92829	432.394	-14.4657	-3.4613
1000	1000	0.007	-0.0007	388.78339	397.2115	-8.42807	-2.16781
1000	1000	0.007	-0.0008	364.53014	369.0575	-4.52732	-1.24196
1000	1000	0.007	-0.0009	343.7806	345.885	-2.10438	-0.61213
1000	1000	0.007	-0.001	327.32184	326.3921	0.92972	0.284039
1000	1000	0.007	-0.002	230.36588	222.8466	7.519295	3.264066
1000	1000	0.007	-0.003	185.17055	178.2617	6.90887	3.731085
1000	1000	0.007	-0.004	157.01314	152.1501	4.863019	3.097205
1000	1000	0.007	-0.005	137.41919	134.5606	2.858572	2.080184
1000	1000	0.007	-0.006	118.56115	121.7095	-3.1483	-2.65543
1000	1000	0.007	-0.007	110.7181	111.8063	-1.08823	-0.98289
1000	1000	0.007	-0.008	104.13266	103.8816	0.251062	0.241098
1000	1000	0.007	-0.009	98.49879	97.35905	1.13974	1.157111
1000	1000	0.007	-0.01	93.60631	91.87224	1.734072	1.852517
1000	1000	0.008	-0.0005	417.71084	444.1663	-26.4554	-6.33343
1000	1000	0.008	-0.0006	384.06376	401.7463	-17.6826	-4.60407
1000	1000	0.008	-0.0007	357.54961	369.0575	-11.5079	-3.21853
1000	1000	0.008	-0.0008	335.48311	342.899	-7.41589	-2.21051
1000	1000	0.008	-0.0009	316.57117	321.369	-4.79778	-1.51555
1000	1000	0.008	-0.001	301.63643	303.2577	-1.6213	-0.5375
1000	1000	0.008	-0.002	213.38555	207.0514	6.334134	2.968399
1000	1000	0.008	-0.003	172.20059	165.6266	6.57394	3.817606
1000	1000	0.008	-0.004	146.50641	141.3659	5.140555	3.508758
1000	1000	0.008	-0.005	128.58944	125.0231	3.566359	2.773446
1000	1000	0.008	-0.006	114.82772	113.0828	1.744924	1.519602
1000	1000	0.008	-0.007	104.14738	103.8816	0.265782	0.255198
1000	1000	0.008	-0.008	95.75639	96.51856	-0.76217	-0.79595
1000	1000	0.008	-0.009	88.51319	90.45833	-1.94514	-2.19757
1000	1000	0.008	-0.01	82.48718	85.36041	-2.87323	-3.48325
1000	1000	0.009	-0.0005	387.21152	416.2778	-29.0663	-7.50657
1000	1000	0.009	-0.0006	356.26255	376.5214	-20.2588	-5.68648
1000	1000	0.009	-0.0007	331.87481	345.885	-14.0102	-4.22152
1000	1000	0.009	-0.0008	311.57613	321.369	-9.79282	-3.143
1000	1000	0.009	-0.0009	294.15236	301.1907	-7.03839	-2.39277
1000	1000	0.009	-0.001	280.44794	284.2167	-3.76876	-1.34384

1000	1000	0.009	-0.002	199.25081	194.051	5.199799	2.609675
1000	1000	0.009	-0.003	161.32903	155.2272	6.101795	3.782205
1000	1000	0.009	-0.004	137.64691	132.4897	5.157176	3.74667
1000	1000	0.009	-0.005	121.10678	117.1731	3.933685	3.248113
1000	1000	0.009	-0.006	108.39582	105.9825	2.4133	2.226378
1000	1000	0.009	-0.007	98.51223	97.35905	1.15318	1.170596
1000	1000	0.009	-0.008	90.73804	90.45833	0.279714	0.308265
1000	1000	0.009	-0.009	84.02116	84.7786	-0.75744	-0.90149
1000	1000	0.009	-0.01	78.42786	80.00078	-1.57292	-2.00556
1000	1000	0.01	-0.0005	361.56752	392.8179	-31.2504	-8.64302
1000	1000	0.01	-0.0006	332.85281	355.3019	-22.4491	-6.74446
1000	1000	0.01	-0.0007	310.42707	326.3921	-15.965	-5.14293
1000	1000	0.01	-0.0008	291.16984	303.2577	-12.0879	-4.15149
1000	1000	0.01	-0.0009	275.71901	284.2167	-8.49769	-3.08201
1000	1000	0.01	-0.001	262.61008	268.1992	-5.58917	-2.12832
1000	1000	0.01	-0.002	187.26031	183.115	4.145328	2.213672
1000	1000	0.01	-0.003	152.05226	146.4792	5.573084	3.665242
1000	1000	0.01	-0.004	130.04837	125.0231	5.025289	3.864169
1000	1000	0.01	-0.005	114.66155	110.5696	4.091917	3.568691
1000	1000	0.01	-0.006	102.86468	100.0097	2.854961	2.775453
1000	1000	0.01	-0.007	94.00595	91.87224	2.133712	2.269763
1000	1000	0.01	-0.008	86.30993	85.36041	0.949515	1.100123
1000	1000	0.01	-0.009	80.57035	80.00078	0.56957	0.706923
1000	1000	0.01	-0.01	74.7368	75.49222	-0.75542	-1.01077

Bijlage 22: Datapunten bij zadels met g- 1/2k

p	E	k1	k2	w(ANSYS)	w(calc)	residual	error	abs (residual)
1000	1000	0.0005	-0.0005	1789.71553	1828.448568	-38.733	-2.1642	38.73303834
1000	1000	0.0005	-0.0006	1645.00205	1654.462525	-9.46047	-0.5751	9.460474607
1000	1000	0.0005	-0.0007	1528.45903	1520.340734	8.118296	0.531143	8.118296459
1000	1000	0.0005	-0.0008	1431.91993	1412.980222	18.93971	1.322679	18.93970756
1000	1000	0.0005	-0.0009	1350.21858	1324.592277	25.6263	1.897937	25.62630302
1000	1000	0.0005	-0.001	1279.89662	1250.222129	29.67449	2.318507	29.67449104
1000	1000	0.0005	-0.002	881.81948	854.8533433	26.96614	3.058011	26.96613668
1000	1000	0.0005	-0.003	698.4513	684.4108704	14.04043	2.010223	14.0404296
1000	1000	0.0005	-0.004	588.39667	584.5155206	3.881149	0.659614	3.881149388
1000	1000	0.0005	-0.005	513.48005	517.1864595	-3.70641	-0.72182	3.706409501
1000	1000	0.0005	-0.006	458.5124	467.9735762	-9.46118	-2.06345	9.46117623
1000	1000	0.0005	-0.007	416.11266	430.0365101	-13.9239	-3.34617	13.92385009
1000	1000	0.0005	-0.008	382.21467	399.6690152	-17.4543	-4.56663	17.45434517
1000	1000	0.0005	-0.009	354.37401	374.6680119	-20.294	-5.72672	20.29400193
1000	1000	0.0005	-0.01	331.02304	353.6320177	-22.609	-6.83003	22.60897769
1000	1000	0.0006	-0.0005	1645.00206	1654.462525	-9.46046	-0.5751	9.460464607
1000	1000	0.0006	-0.0006	1463.37296	1497.032125	-33.6592	-2.30011	33.65916479
1000	1000	0.0006	-0.0007	1362.31886	1375.672694	-13.3538	-0.98023	13.35383424
1000	1000	0.0006	-0.0008	1278.99406	1278.528074	0.465986	0.036434	0.465986245
1000	1000	0.0006	-0.0009	1208.21447	1198.550684	9.663786	0.79984	9.663785776
1000	1000	0.0006	-0.001	1147.77155	1131.257228	16.51432	1.438816	16.51432154
1000	1000	0.0006	-0.002	798.05766	773.509764	24.5479	3.075955	24.54789601
1000	1000	0.0006	-0.003	634.90203	619.2857465	15.61628	2.459637	15.61628354
1000	1000	0.0006	-0.004	536.33502	528.8959398	7.43908	1.387021	7.439080213
1000	1000	0.0006	-0.005	468.95273	467.9735762	0.979154	0.208796	0.97915377
1000	1000	0.0006	-0.006	419.3595	423.4435454	-4.08405	-0.97388	4.084045411
1000	1000	0.0006	-0.007	381.01273	389.1163812	-8.10365	-2.12687	8.103651223
1000	1000	0.0006	-0.008	350.295	361.6385056	-11.3435	-3.23827	11.34350561
1000	1000	0.0006	-0.009	325.02546	339.0164731	-13.991	-4.30459	13.99101311
1000	1000	0.0006	-0.01	303.80213	319.9821591	-16.18	-5.32584	16.18002914
1000	1000	0.0007	-0.0005	1528.45904	1520.340734	8.118306	0.531143	8.118306459
1000	1000	0.0007	-0.0006	1363.14572	1375.672694	-12.527	-0.91898	12.52697424
1000	1000	0.0007	-0.0007	1233.21306	1264.15147	-30.9384	-2.50876	30.93841032
1000	1000	0.0007	-0.0008	1159.70296	1174.882042	-15.1791	-1.30888	15.17908211
1000	1000	0.0007	-0.0009	1097.31801	1101.388154	-4.07014	-0.37092	4.070144363
1000	1000	0.0007	-0.001	1042.76404	1039.549956	3.214084	0.308227	3.214084074
1000	1000	0.0007	-0.002	731.1618	710.8038922	20.35791	2.784323	20.3579078

1000	1000	0.0007	-0.003	584.06171	569.0823044	14.97941	2.564696	14.9794056
1000	1000	0.0007	-0.004	494.64732	486.0200996	8.62722	1.744115	8.627220358
1000	1000	0.0007	-0.005	433.27637	430.0365101	3.23986	0.747758	3.239859906
1000	1000	0.0007	-0.006	387.97473	389.1163812	-1.14165	-0.29426	1.141651223
1000	1000	0.0007	-0.007	352.86639	357.5720064	-4.70562	-1.33354	4.705616414
1000	1000	0.0007	-0.008	324.69127	332.3216711	-7.6304	-2.35005	7.630401067
1000	1000	0.0007	-0.009	301.47851	311.5335317	-10.055	-3.33524	10.05502174
1000	1000	0.0007	-0.01	281.95815	294.0422665	-12.0841	-4.28578	12.08411648
1000	1000	0.0008	-0.0005	1429.65793	1412.980222	16.67771	1.166552	16.67770756
1000	1000	0.0008	-0.0006	1278.99407	1278.528074	0.465996	0.036435	0.465996245
1000	1000	0.0008	-0.0007	1159.70297	1174.882042	-15.1791	-1.30888	15.17907211
1000	1000	0.0008	-0.0008	1063.93374	1091.916471	-27.9827	-2.63012	27.98273147
1000	1000	0.0008	-0.0009	984.00192	1023.612434	-39.6105	-4.02545	39.61051438
1000	1000	0.0008	-0.001	959.80037	966.1410074	-6.34064	-0.66062	6.340637444
1000	1000	0.0008	-0.002	678.12473	660.6097038	17.51503	2.582862	17.51502617
1000	1000	0.0008	-0.003	543.71381	528.8959398	14.81787	2.725307	14.81787021
1000	1000	0.0008	-0.004	461.5488	451.6992628	9.849537	2.134019	9.849537229
1000	1000	0.0008	-0.005	404.94523	399.6690152	5.276215	1.302945	5.276214835
1000	1000	0.0008	-0.006	363.05104	361.6385056	1.412534	0.389073	1.412534391
1000	1000	0.0008	-0.007	330.51664	332.3216711	-1.80503	-0.54612	1.805031067
1000	1000	0.0008	-0.008	304.3641	308.8544156	-4.49032	-1.47531	4.490315557
1000	1000	0.0008	-0.009	282.78843	289.5342532	-6.74582	-2.38547	6.745823248
1000	1000	0.0008	-0.01	264.62405	273.2781527	-8.6541	-3.27034	8.654102676
1000	1000	0.0009	-0.0005	1348.02826	1324.592277	23.43598	1.738538	23.43598302
1000	1000	0.0009	-0.0006	1208.15497	1198.550684	9.604286	0.794955	9.604285776
1000	1000	0.0009	-0.0007	1097.02458	1101.388154	-4.36357	-0.39776	4.363574363
1000	1000	0.0009	-0.0008	1008.97769	1023.612434	-14.6347	-1.45045	14.63474438
1000	1000	0.0009	-0.0009	935.89035	959.5811064	-23.6908	-2.53136	23.69075642
1000	1000	0.0009	-0.001	889.97872	905.7047626	-15.726	-1.76701	15.72604261
1000	1000	0.0009	-0.002	633.28301	619.2857465	13.99726	2.21027	13.99726354
1000	1000	0.0009	-0.003	509.54314	495.8112407	13.7319	2.694943	13.7318993
1000	1000	0.0009	-0.004	433.49311	423.4435454	10.04956	2.318276	10.04956459
1000	1000	0.0009	-0.005	380.91696	374.6680119	6.248948	1.640501	6.248948071
1000	1000	0.0009	-0.006	341.90386	339.0164731	2.887387	0.844503	2.887386887
1000	1000	0.0009	-0.007	311.54722	311.5335317	0.013688	0.004394	0.013688265
1000	1000	0.0009	-0.008	287.10692	289.5342532	-2.42733	-0.84545	2.427333248
1000	1000	0.0009	-0.009	266.91787	271.4226496	-4.50478	-1.6877	4.504779577
1000	1000	0.0009	-0.01	249.90257	256.1834375	-6.28087	-2.51333	6.280867499
1000	1000	0.001	-0.0005	1277.84006	1250.222129	27.61793	2.161298	27.61793104
1000	1000	0.001	-0.0006	1147.04242	1131.257228	15.78519	1.376165	15.78519154
1000	1000	0.001	-0.0007	1043.01847	1039.549956	3.468514	0.332546	3.468514074

1000	1000	0.001	-0.0008	960.53643	966.1410074	-5.60458	-0.58348	5.604577444
1000	1000	0.001	-0.0009	891.98383	905.7047626	-13.7209	-1.53825	13.72093261
1000	1000	0.001	-0.001	832.24642	854.8533433	-22.6069	-2.71637	22.60692332
1000	1000	0.001	-0.002	596.08258	584.5155206	11.56706	1.940513	11.56705939
1000	1000	0.001	-0.003	481.16815	467.9735762	13.19457	2.742196	13.19457377
1000	1000	0.001	-0.004	410.18697	399.6690152	10.51795	2.564186	10.51795483
1000	1000	0.001	-0.005	360.95428	353.6320177	7.322262	2.028584	7.322262309
1000	1000	0.001	-0.006	324.3358	319.9821591	4.353641	1.342325	4.353640862
1000	1000	0.001	-0.007	295.79088	294.0422665	1.748614	0.591165	1.748613518
1000	1000	0.001	-0.008	272.77595	273.2781527	-0.5022	-0.18411	0.502202676
1000	1000	0.001	-0.009	253.74167	256.1834375	-2.44177	-0.9623	2.441767499
1000	1000	0.001	-0.01	237.68347	241.7998415	-4.11637	-1.73187	4.116371505
1000	1000	0.002	-0.0005	880.48053	854.8533433	25.62719	2.910591	25.62718668
1000	1000	0.002	-0.0006	797.57864	773.509764	24.06888	3.017743	24.06887601
1000	1000	0.002	-0.0007	731.33028	710.8038922	20.52639	2.806719	20.5263878
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1000	1000	0.002	-0.0009	634.49933	619.2857465	15.21358	2.39773	15.21358354
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1000	1000	0.002	-0.002	384.41958	399.6690152	-15.2494	-3.96687	15.24943517
1000	1000	0.002	-0.003	318.48002	319.9821591	-1.50214	-0.47166	1.502139138
1000	1000	0.002	-0.004	276.01194	273.2781527	2.733787	0.99046	2.733787324
1000	1000	0.002	-0.005	245.73301	241.7998415	3.933168	1.600586	3.933168495
1000	1000	0.002	-0.006	222.75721	218.7913749	3.965835	1.78034	3.965835086
1000	1000	0.002	-0.007	204.57157	201.0546836	3.516886	1.719147	3.51688639
1000	1000	0.002	-0.008	189.73043	186.8569889	2.873441	1.514486	2.873441101
1000	1000	0.002	-0.009	177.33412	175.1682865	2.165834	1.221329	2.16583352
1000	1000	0.002	-0.01	166.78903	165.3333421	1.455688	0.872772	1.455687918
1000	1000	0.003	-0.0005	697.42091	684.4108704	13.01004	1.86545	13.0100396
1000	1000	0.003	-0.0006	634.53181	619.2857465	15.24606	2.402726	15.24606354
1000	1000	0.003	-0.0007	584.19247	569.0823044	15.11017	2.586505	15.1101656
1000	1000	0.003	-0.0008	544.09492	528.8959398	15.19898	2.793443	15.19898021
1000	1000	0.003	-0.0009	510.43605	495.8112407	14.62481	2.86516	14.6248093
1000	1000	0.003	-0.001	481.16816	467.9735762	13.19458	2.742198	13.19458377
1000	1000	0.003	-0.002	318.6341	319.9821591	-1.34806	-0.42307	1.348059138
1000	1000	0.003	-0.003	244.44009	256.1834375	-11.7433	-4.80418	11.7433475
1000	1000	0.003	-0.004	214.49169	218.7913749	-4.29968	-2.00459	4.299684914
1000	1000	0.003	-0.005	192.66121	193.5892762	-0.92807	-0.48171	0.928066197
1000	1000	0.003	-0.006	175.8303	175.1682865	0.662014	0.376507	0.66201352
1000	1000	0.003	-0.007	162.34748	160.9679743	1.379506	0.849724	1.379505688
1000	1000	0.003	-0.008	151.23875	149.6010461	1.637704	1.08286	1.637703911
1000	1000	0.003	-0.009	141.88688	140.242862	1.644018	1.158682	1.644018047

1000	1000	0.003	-0.01	133.87889	132.3688296	1.51006	1.12793	1.51006037
1000	1000	0.004	-0.0005	587.67897	584.5155206	3.163449	0.538295	3.163449388
1000	1000	0.004	-0.0006	536.04947	528.8959398	7.15353	1.334491	7.153530213
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1000	1000	0.004	-0.0008	461.54882	451.6992628	9.849557	2.134023	9.849557229
1000	1000	0.004	-0.0009	433.49312	423.4435454	10.04957	2.318278	10.04957459
1000	1000	0.004	-0.001	409.85489	399.6690152	10.18587	2.485239	10.18587483
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1000	1000	0.004	-0.004	176.87479	186.8569889	-9.9822	-5.64365	9.982198899
1000	1000	0.004	-0.005	159.54277	165.3333421	-5.79057	-3.62948	5.790572082
1000	1000	0.004	-0.006	146.44195	149.6010461	-3.1591	-2.15723	3.159096089
1000	1000	0.004	-0.007	135.83701	137.4733853	-1.63638	-1.20466	1.636375324
1000	1000	0.004	-0.008	127.02391	127.765553	-0.74164	-0.58386	0.741643003
1000	1000	0.004	-0.009	119.55227	119.7732722	-0.221	-0.18486	0.221002184
1000	1000	0.004	-0.01	113.11693	113.0485191	0.068411	0.060478	0.068410887
1000	1000	0.005	-0.0005	513.48011	517.1864595	-3.70635	-0.72181	3.706349501
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1000	1000	0.005	-0.0007	433.56739	430.0365101	3.53088	0.814379	3.530879906
1000	1000	0.005	-0.0008	404.24083	399.6690152	4.571815	1.130963	4.571814835
1000	1000	0.005	-0.0009	381.82592	374.6680119	7.157908	1.874652	7.157908071
1000	1000	0.005	-0.001	360.66923	353.6320177	7.037212	1.951154	7.037212309
1000	1000	0.005	-0.002	245.73301	241.7998415	3.933168	1.600586	3.933168495
1000	1000	0.005	-0.003	192.42605	193.5892762	-1.16323	-0.60451	1.163226197
1000	1000	0.005	-0.004	159.92788	165.3333421	-5.40546	-3.37994	5.405462082
1000	1000	0.005	-0.005	137.47913	146.2889569	-8.80983	-6.40812	8.809826946
1000	1000	0.005	-0.006	126.7946	132.3688296	-5.57423	-4.39627	5.57422963
1000	1000	0.005	-0.007	118.06564	121.6381275	-3.57249	-3.02585	3.572487516
1000	1000	0.005	-0.008	110.76454	113.0485191	-2.28398	-2.06201	2.283979113
1000	1000	0.005	-0.009	104.54058	105.9768516	-1.43627	-1.37389	1.436271596
1000	1000	0.005	-0.01	99.15291	100.0267081	-0.8738	-0.88126	0.873798086
1000	1000	0.006	-0.0005	457.98291	467.9735762	-9.99067	-2.18145	9.99066623
1000	1000	0.006	-0.0006	419.14037	423.4435454	-4.30318	-1.02667	4.303175411
1000	1000	0.006	-0.0007	388.14573	389.1163812	-0.97065	-0.25007	0.970651223
1000	1000	0.006	-0.0008	363.05106	361.6385056	1.412554	0.389079	1.412554391
1000	1000	0.006	-0.0009	341.90388	339.0164731	2.887407	0.844508	2.887406887
1000	1000	0.006	-0.001	324.08356	319.9821591	4.101401	1.265538	4.101400862
1000	1000	0.006	-0.002	222.75721	218.7913749	3.965835	1.78034	3.965835086
1000	1000	0.006	-0.003	175.61724	175.1682865	0.448954	0.255643	0.44895352
1000	1000	0.006	-0.004	146.7911	149.6010461	-2.80995	-1.91425	2.809946089
1000	1000	0.006	-0.005	127.79406	132.3688296	-4.57477	-3.5798	4.57476963

1000	1000	0.006	-0.006	111.84165	119.7732722	-7.93162	-7.09183	7.931622184
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1000	1000	0.006	-0.008	98.33604	102.291386	-3.95535	-4.02228	3.955346027
1000	1000	0.006	-0.009	93.0366	95.89262311	-2.85602	-3.06978	2.856023111
1000	1000	0.006	-0.01	88.43028	90.50866557	-2.07839	-2.35031	2.078385572
1000	1000	0.007	-0.0005	415.63939	430.0365101	-14.3971	-3.46385	14.39712009
1000	1000	0.007	-0.0006	380.81423	389.1163812	-8.30215	-2.18011	8.302151223
1000	1000	0.007	-0.0007	353.02133	357.5720064	-4.55068	-1.28907	4.550676414
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1000	1000	0.007	-0.002	204.65217	201.0546836	3.597486	1.757854	3.59748639
1000	1000	0.007	-0.003	163.18687	160.9679743	2.218896	1.359727	2.218895688
1000	1000	0.007	-0.004	136.10376	137.4733853	-1.36963	-1.00631	1.369625324
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1000	1000	0.007	-0.008	88.52826	93.99896254	-5.4707	-6.17961	5.470702536
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1000	1000	0.007	-0.01	79.95364	83.17142816	-3.21779	-4.02457	3.21778816
1000	1000	0.008	-0.0005	381.78448	399.6690152	-17.8845	-4.68446	17.88453517
1000	1000	0.008	-0.0006	350.11259	361.6385056	-11.5259	-3.29206	11.52591561
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1000	1000	0.008	-0.0008	304.36413	308.8544156	-4.49029	-1.4753	4.490285557
1000	1000	0.008	-0.0009	287.10694	289.5342532	-2.42731	-0.84544	2.427313248
1000	1000	0.008	-0.001	272.53772	273.2781527	-0.74043	-0.27168	0.740432676
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1000	1000	0.008	-0.006	98.21288	102.291386	-4.07851	-4.15272	4.078506027
1000	1000	0.008	-0.007	89.05812	93.99896254	-4.94084	-5.54789	4.940842536
1000	1000	0.008	-0.008	80.90202	87.36112377	-6.4591	-7.98386	6.459103769
1000	1000	0.008	-0.009	76.89049	81.8963125	-5.00582	-6.51033	5.005822499
1000	1000	0.008	-0.01	73.36547	77.29818748	-3.93272	-5.36045	3.932717485
1000	1000	0.009	-0.0005	354.37409	374.6680119	-20.2939	-5.72669	20.29392193
1000	1000	0.009	-0.0006	325.02552	339.0164731	-13.991	-4.30457	13.99095311
1000	1000	0.009	-0.0007	301.67912	311.5335317	-9.85441	-3.26652	9.854411735
1000	1000	0.009	-0.0008	282.27387	289.5342532	-7.26038	-2.57211	7.260383248
1000	1000	0.009	-0.0009	267.52404	271.4226496	-3.89861	-1.45729	3.898609577
1000	1000	0.009	-0.001	253.13197	256.1834375	-3.05147	-1.20548	3.051467499

1000	1000	0.009	-0.002	177.33412	175.1682865	2.165834	1.221329	2.16583352
1000	1000	0.009	-0.003	141.71804	140.242862	1.475178	1.040925	1.475178047
1000	1000	0.009	-0.004	119.83124	119.7732722	0.057968	0.048375	0.057967816
1000	1000	0.009	-0.005	105.3305	105.9768516	-0.64635	-0.61364	0.646351596
1000	1000	0.009	-0.006	93.09473	95.89262311	-2.79789	-3.00543	2.797893111
1000	1000	0.009	-0.007	84.2495	88.11892611	-3.86943	-4.59282	3.869426113
1000	1000	0.009	-0.008	76.80427	81.8963125	-5.09204	-6.6299	5.092042499
1000	1000	0.009	-0.009	70.72891	76.77334851	-6.04444	-8.54592	6.044438506
1000	1000	0.009	-0.01	67.60802	72.46285584	-4.85484	-7.18086	4.854835842
1000	1000	0.01	-0.0005	331.02312	353.6320177	-22.6089	-6.83001	22.60889769
1000	1000	0.01	-0.0006	303.80219	319.9821591	-16.18	-5.32582	16.17996914
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1000	1000	0.01	-0.0008	264.13786	273.2781527	-9.14029	-3.46043	9.140292676
1000	1000	0.01	-0.0009	250.46716	256.1834375	-5.71628	-2.28225	5.716277499
1000	1000	0.01	-0.001	237.11005	241.7998415	-4.68979	-1.9779	4.689791505
1000	1000	0.01	-0.002	166.78903	165.3333421	1.455688	0.872772	1.455687918
1000	1000	0.01	-0.003	133.72074	132.3688296	1.35191	1.010995	1.35191037
1000	1000	0.01	-0.004	113.38006	113.0485191	0.331541	0.292416	0.331540887
1000	1000	0.01	-0.005	99.89386	100.0267081	-0.13285	-0.13299	0.132848086
1000	1000	0.01	-0.006	88.48658	90.50866557	-2.02209	-2.28519	2.022085572
1000	1000	0.01	-0.007	80.23348	83.17142816	-2.93795	-3.66175	2.93794816
1000	1000	0.01	-0.008	73.28617	77.29818748	-4.01202	-5.47445	4.012017485
1000	1000	0.01	-0.009	67.58482	72.46285584	-4.87804	-7.21765	4.878035842
1000	1000	0.01	-0.01	62.88206	68.39437877	-5.51232	-8.76612	5.512318765

Bijlage 23: Datapunten bij zadels met g=1/4k

P	E	k1	k2	w(ANSYS)	w(calc)	residual	% error	abs residual
1000	1000	0.0005	-0.0005	1542.35813	1579.64079	-37.2827	-2.4173	37.2826608
1000	1000	0.0005	-0.0006	1421.04019	1428.29643	-7.25624	-0.5106	7.256237876
1000	1000	0.0005	-0.0007	1322.65672	1311.70664	10.95008	0.82789	10.95008442
1000	1000	0.0005	-0.0008	1240.77004	1218.43332	22.33672	1.80023	22.33672105
1000	1000	0.0005	-0.0009	1171.22294	1141.68144	29.5415	2.52228	29.5415049
1000	1000	0.0005	-0.001	1111.19321	1077.13055	34.06266	3.06541	34.06265558
1000	1000	0.0005	-0.002	767.8099	734.477255	33.33265	4.34126	33.33264541
1000	1000	0.0005	-0.003	608.82733	587.090347	21.73698	3.5703	21.73698257
1000	1000	0.0005	-0.004	513.12984	500.827718	12.30212	2.39747	12.30212205
1000	1000	0.0005	-0.005	447.9415	442.746295	5.195205	1.1598	5.19520513
1000	1000	0.0005	-0.006	400.09681	400.327059	-0.23025	-0.0575	0.230248594
1000	1000	0.0005	-0.007	363.17204	367.648934	-4.47689	-1.2327	4.47689401
1000	1000	0.0005	-0.008	333.62586	341.506019	-7.88016	-2.362	7.880158742
1000	1000	0.0005	-0.009	309.33189	319.993779	-10.6619	-3.4467	10.66188849
1000	1000	0.0005	-0.01	288.92907	301.901271	-12.9722	-4.4898	12.97220074
1000	1000	0.0006	-0.0005	1418.14515	1428.29643	-10.1513	-0.7158	10.15127788
1000	1000	0.0006	-0.0006	1253.49127	1291.45227	-37.961	-3.0284	37.96100052
1000	1000	0.0006	-0.0007	1170.23144	1186.03287	-15.8014	-1.3503	15.80143084
1000	1000	0.0006	-0.0008	1100.48343	1101.69601	-1.21258	-0.1102	1.212580376
1000	1000	0.0006	-0.0009	1040.92712	1032.29768	8.629445	0.82902	8.629445097
1000	1000	0.0006	-0.001	990.38551	973.931372	16.45414	1.66139	16.45413763
1000	1000	0.0006	-0.002	691.84106	664.107464	27.7336	4.00867	27.73359633
1000	1000	0.0006	-0.003	551.13043	530.841601	20.28883	3.68131	20.28882921
1000	1000	0.0006	-0.004	465.85937	452.843738	13.01563	2.7939	13.01563192
1000	1000	0.0006	-0.005	407.51825	400.327059	7.191191	1.76463	7.191191406
1000	1000	0.0006	-0.006	364.5636	361.971982	2.591618	0.71088	2.591618078
1000	1000	0.0006	-0.007	331.32893	332.424727	-1.0958	-0.3307	1.095797328
1000	1000	0.0006	-0.008	304.67919	308.786548	-4.10736	-1.3481	4.10735787
1000	1000	0.0006	-0.009	282.72696	289.335382	-6.60842	-2.3374	6.608421453
1000	1000	0.0006	-0.01	264.26153	272.976305	-8.71478	-3.2978	8.714775173
1000	1000	0.0007	-0.0005	1322.65673	1311.70664	10.95009	0.82789	10.95009442
1000	1000	0.0007	-0.0006	1171.7238	1186.03287	-14.3091	-1.2212	14.30907084
1000	1000	0.0007	-0.0007	1053.58095	1089.21871	-35.6378	-3.3825	35.63775582
1000	1000	0.0007	-0.0008	995.55972	1011.76614	-16.2064	-1.6279	16.20642251
1000	1000	0.0007	-0.0009	943.48035	948.032694	-4.55234	-0.4825	4.552343797
1000	1000	0.0007	-0.001	895.9108	894.430749	1.480051	0.1652	1.480051034
1000	1000	0.0007	-0.002	631.57538	609.897322	21.67806	3.43238	21.67805769
1000	1000	0.0007	-0.003	505.27736	487.509761	17.7676	3.51641	17.76759899

1000	1000	0.0007	-0.004	428.26324	415.878752	12.38449	2.89179	12.38448785
1000	1000	0.0007	-0.005	375.35542	367.648934	7.706486	2.05312	7.70648599
1000	1000	0.0007	-0.006	336.28303	332.424727	3.858303	1.14734	3.858302672
1000	1000	0.0007	-0.007	305.98043	305.289373	0.691057	0.22585	0.691057181
1000	1000	0.0007	-0.008	281.6335	283.580744	-1.94724	-0.6914	1.947244104
1000	1000	0.0007	-0.009	261.54367	265.717349	-4.17368	-1.5958	4.17367855
1000	1000	0.0007	-0.01	244.61936	250.69364	-6.07428	-2.4832	6.074280243
1000	1000	0.0008	-0.0005	1239.31415	1218.43332	20.88083	1.68487	20.88083105
1000	1000	0.0008	-0.0006	1102.04838	1101.69601	0.35237	0.03197	0.352369624
1000	1000	0.0008	-0.0007	993.21372	1011.76614	-18.5524	-1.8679	18.55242251
1000	1000	0.0008	-0.0008	905.98126	939.821105	-33.8398	-3.7352	33.83984449
1000	1000	0.0008	-0.0009	834.6096	880.619637	-46.01	-5.5128	46.01003723
1000	1000	0.0008	-0.001	820.03606	830.829239	-10.7932	-1.3162	10.79317915
1000	1000	0.0008	-0.002	583.12718	566.52852	16.59866	2.84649	16.59866022
1000	1000	0.0008	-0.003	468.39723	452.843738	15.55349	3.32058	15.55349192
1000	1000	0.0008	-0.004	398.00546	386.306293	11.69917	2.93945	11.69916672
1000	1000	0.0008	-0.005	349.46141	341.506019	7.955391	2.27647	7.955391258
1000	1000	0.0008	-0.006	313.5078	308.786548	4.721252	1.50594	4.72125213
1000	1000	0.0008	-0.007	285.56068	283.580744	1.979936	0.69335	1.979935896
1000	1000	0.0008	-0.008	263.06497	263.415781	-0.35081	-0.1334	0.350810523
1000	1000	0.0008	-0.009	244.47369	246.822622	-2.34893	-0.9608	2.348931854
1000	1000	0.0008	-0.01	228.7905	232.867225	-4.07672	-1.7819	4.076724908
1000	1000	0.0009	-0.0005	1169.85923	1141.68144	28.17779	2.40865	28.1777949
1000	1000	0.0009	-0.0006	1042.39577	1032.29768	10.0981	0.96874	10.0980951
1000	1000	0.0009	-0.0007	941.27876	948.032694	-6.75393	-0.7175	6.753933797
1000	1000	0.0009	-0.0008	860.09087	880.619637	-20.5288	-2.3868	20.52876723
1000	1000	0.0009	-0.0009	793.55677	825.147405	-31.5906	-3.9809	31.59063493
1000	1000	0.0009	-0.001	758.72639	778.493417	-19.767	-2.6053	19.76702719
1000	1000	0.0009	-0.002	543.93191	530.841601	13.09031	2.40661	13.09030921
1000	1000	0.0009	-0.003	438.57477	424.318082	14.25669	3.25069	14.25668814
1000	1000	0.0009	-0.004	373.5402	361.971982	11.56822	3.09691	11.56821808
1000	1000	0.0009	-0.005	328.52286	319.993779	8.529082	2.59619	8.529081506
1000	1000	0.0009	-0.006	295.09263	289.335382	5.757249	1.951	5.757248547
1000	1000	0.0009	-0.007	269.05321	265.717349	3.335861	1.23985	3.33586145
1000	1000	0.0009	-0.008	248.05845	246.822622	1.235828	0.4982	1.235828146
1000	1000	0.0009	-0.009	230.68396	231.274704	-0.59074	-0.2561	0.590743959
1000	1000	0.0009	-0.01	216.01007	218.198389	-2.18832	-1.0131	2.188319183
1000	1000	0.001	-0.0005	1109.90689	1077.13055	32.77634	2.95307	32.77633558
1000	1000	0.001	-0.0006	990.68718	973.931372	16.75581	1.69133	16.75580763
1000	1000	0.001	-0.0007	896.07131	894.430749	1.640561	0.18308	1.640561034
1000	1000	0.001	-0.0008	820.03606	830.829239	-10.7932	-1.3162	10.79317915

1000	1000	0.001	-0.0009	757.60942	778.493417	-20.884	-2.7566	20.88399719
1000	1000	0.001	-0.001	705.56606	734.477255	-28.9112	-4.0976	28.91119459
1000	1000	0.001	-0.002	509.63852	500.827718	8.810802	1.72883	8.810802046
1000	1000	0.001	-0.003	412.42595	400.327059	12.09889	2.93359	12.09889141
1000	1000	0.001	-0.004	352.05939	341.506019	10.55337	2.99761	10.55337126
1000	1000	0.001	-0.005	310.12398	301.901271	8.222709	2.65143	8.222709257
1000	1000	0.001	-0.006	278.90313	272.976305	5.926825	2.12505	5.926824827
1000	1000	0.001	-0.007	254.53582	250.69364	3.84218	1.50948	3.842179757
1000	1000	0.001	-0.008	234.85669	232.867225	1.989465	0.8471	1.989465092
1000	1000	0.001	-0.009	218.54826	218.198389	0.349871	0.16009	0.349870817
1000	1000	0.001	-0.01	204.75825	205.861412	-1.10316	-0.5388	1.103161676
1000	1000	0.002	-0.0005	767.80444	734.477255	33.32719	4.34058	33.32718541
1000	1000	0.002	-0.0006	692.03955	664.107464	27.93209	4.0362	27.93208633
1000	1000	0.002	-0.0007	631.68335	609.897322	21.78603	3.44888	21.78602769
1000	1000	0.002	-0.0008	583.12719	566.52852	16.59867	2.84649	16.59867022
1000	1000	0.002	-0.0009	543.14978	530.841601	12.30818	2.26607	12.30817921
1000	1000	0.002	-0.001	420.47884	500.827718	-80.3489	-19.109	80.34887795
1000	1000	0.002	-0.002	322.23955	341.506019	-19.2665	-5.9789	19.26646874
1000	1000	0.002	-0.003	268.40431	272.976305	-4.572	-1.7034	4.571995173
1000	1000	0.002	-0.004	233.21544	232.867225	0.348215	0.14931	0.348215092
1000	1000	0.002	-0.005	208.10394	205.861412	2.242528	1.0776	2.242528324
1000	1000	0.002	-0.006	189.01413	186.137963	2.876167	1.52167	2.876167087
1000	1000	0.002	-0.007	173.8548	170.943788	2.911012	1.67439	2.911012478
1000	1000	0.002	-0.008	161.43697	158.788254	2.648716	1.64071	2.64871603
1000	1000	0.002	-0.009	151.02418	148.785821	2.238359	1.48212	2.238359019
1000	1000	0.002	-0.01	142.13104	140.373443	1.757597	1.2366	1.75759701
1000	1000	0.003	-0.0005	608.82534	587.090347	21.73499	3.56999	21.73499257
1000	1000	0.003	-0.0006	551.28431	530.841601	20.44271	3.7082	20.44270921
1000	1000	0.003	-0.0007	505.36147	487.509761	17.85171	3.53246	17.85170899
1000	1000	0.003	-0.0008	468.39724	452.843738	15.5535	3.32058	15.55350192
1000	1000	0.003	-0.0009	437.94863	424.318082	13.63055	3.11236	13.63054814
1000	1000	0.003	-0.001	288.03756	400.327059	-112.289	-38.984	112.2894986
1000	1000	0.003	-0.002	235.92608	272.976305	-37.0502	-15.704	37.05022517
1000	1000	0.003	-0.003	201.13695	218.198389	-17.0614	-8.4825	17.06143918
1000	1000	0.003	-0.004	177.63459	186.137963	-8.50337	-4.787	8.503372913
1000	1000	0.003	-0.005	160.13464	164.551383	-4.41674	-2.7581	4.416742561
1000	1000	0.003	-0.006	146.42586	148.785821	-2.35996	-1.6117	2.359960981
1000	1000	0.003	-0.007	135.36113	136.640648	-1.27952	-0.9453	1.279517453
1000	1000	0.003	-0.008	126.21871	126.924354	-0.70564	-0.5591	0.705644169
1000	1000	0.003	-0.009	118.51101	118.929101	-0.41809	-0.3528	0.418090644
1000	1000	0.003	-0.01	111.90005	112.204827	-0.30478	-0.2724	0.304777174

1000	1000	0.004	-0.0005	513.12851	500.827718	12.30079	2.39721	12.30079205
1000	1000	0.004	-0.0006	465.98731	452.843738	13.14357	2.82059	13.14357192
1000	1000	0.004	-0.0007	428.33243	415.878752	12.45368	2.90748	12.45367785
1000	1000	0.004	-0.0008	398.00547	386.306293	11.69918	2.93945	11.69917672
1000	1000	0.004	-0.0009	373.01399	361.971982	11.04201	2.96021	11.04200808
1000	1000	0.004	-0.001	351.84525	341.506019	10.33923	2.93857	10.33923126
1000	1000	0.004	-0.002	233.21545	232.867225	0.348225	0.14931	0.348225092
1000	1000	0.004	-0.003	177.56342	186.137963	-8.57454	-4.829	8.574542913
1000	1000	0.004	-0.004	143.72557	158.788254	-15.0627	-10.48	15.06268397
1000	1000	0.004	-0.005	131.26687	140.373443	-9.10657	-6.9374	9.10657299
1000	1000	0.004	-0.006	121.10102	126.924354	-5.82333	-4.8087	5.823334169
1000	1000	0.004	-0.007	112.70553	116.563701	-3.85817	-3.4232	3.858170875
1000	1000	0.004	-0.008	105.5939	108.275047	-2.68115	-2.5391	2.681146472
1000	1000	0.004	-0.009	99.47238	101.454555	-1.98218	-1.9927	1.982175223
1000	1000	0.004	-0.01	94.14278	95.7182958	-1.57552	-1.6735	1.575515801
1000	1000	0.005	-0.0005	447.93857	442.746295	5.192275	1.15915	5.19227513
1000	1000	0.005	-0.0006	407.63031	400.327059	7.303251	1.79164	7.303251406
1000	1000	0.005	-0.0007	375.4145	367.648934	7.765566	2.06853	7.76556599
1000	1000	0.005	-0.0008	349.46143	341.506019	7.955411	2.27648	7.955411258
1000	1000	0.005	-0.0009	328.06699	319.993779	8.073212	2.46084	8.073211506
1000	1000	0.005	-0.001	309.47637	301.901271	7.575099	2.44771	7.575099257
1000	1000	0.005	-0.002	207.53954	205.861412	1.678128	0.80858	1.678128324
1000	1000	0.005	-0.003	160.06628	164.551383	-4.4851	-2.802	4.485102561
1000	1000	0.005	-0.004	130.96217	140.373443	-9.41127	-7.1863	9.41127299
1000	1000	0.005	-0.005	110.39526	124.094214	-13.699	-12.409	13.69895355
1000	1000	0.005	-0.006	102.61682	112.204827	-9.58801	-9.3435	9.588007174
1000	1000	0.005	-0.007	96.14355	103.045708	-6.90216	-7.179	6.902157792
1000	1000	0.005	-0.008	90.62706	95.7182958	-5.09124	-5.6178	5.091235801
1000	1000	0.005	-0.009	85.82721	89.6887828	-3.86157	-4.4992	3.861572814
1000	1000	0.005	-0.01	81.58586	84.6177624	-3.0319	-3.7162	3.031902352
1000	1000	0.006	-0.0005	400.09115	400.327059	-0.23591	-0.059	0.235908594
1000	1000	0.006	-0.0006	364.66562	361.971982	2.693638	0.73866	2.693638078
1000	1000	0.006	-0.0007	336.33499	332.424727	3.910263	1.16261	3.910262672
1000	1000	0.006	-0.0008	313.50782	308.786548	4.721272	1.50595	4.72127213
1000	1000	0.006	-0.0009	294.68816	289.335382	5.352779	1.81642	5.352778547
1000	1000	0.006	-0.001	278.73455	272.976305	5.758245	2.06585	5.758244827
1000	1000	0.006	-0.002	189.01414	186.137963	2.876177	1.52167	2.876177087
1000	1000	0.006	-0.003	146.35923	148.785821	-2.42659	-1.658	2.426590981
1000	1000	0.006	-0.004	120.83084	126.924354	-6.09351	-5.043	6.093514169
1000	1000	0.006	-0.005	102.61682	112.204827	-9.58801	-9.3435	9.588007174
1000	1000	0.006	-0.006	87.98382	101.454555	-13.4707	-15.31	13.47073522

1000	1000	0.006	-0.007	82.9381	93.1729652	-10.2349	-12.34	10.23486515
1000	1000	0.006	-0.008	78.57345	86.5475878	-7.97414	-10.149	7.974137762
1000	1000	0.006	-0.009	74.75854	81.0957585	-6.33722	-8.4769	6.337218516
1000	1000	0.006	-0.01	71.38001	76.5105893	-5.13058	-7.1877	5.130579247
1000	1000	0.007	-0.0005	363.16336	367.648934	-4.48557	-1.2351	4.48557401
1000	1000	0.007	-0.0006	331.42434	332.424727	-1.00039	-0.3018	1.000387328
1000	1000	0.007	-0.0007	306.02715	305.289373	0.737777	0.24108	0.737777181
1000	1000	0.007	-0.0008	285.5607	283.580744	1.979956	0.69336	1.979955896
1000	1000	0.007	-0.0009	268.68728	265.717349	2.969931	1.10535	2.96993145
1000	1000	0.007	-0.001	254.38131	250.69364	3.68767	1.44966	3.687669757
1000	1000	0.007	-0.002	173.85481	170.943788	2.911022	1.6744	2.911022478
1000	1000	0.007	-0.003	135.29554	136.640648	-1.34511	-0.9942	1.345107453
1000	1000	0.007	-0.004	112.46161	116.563701	-4.10209	-3.6475	4.102090875
1000	1000	0.007	-0.005	96.14355	103.045708	-6.90216	-7.179	6.902157792
1000	1000	0.007	-0.006	82.9381	93.1729652	-10.2349	-12.34	10.23486515
1000	1000	0.007	-0.007	72.80075	85.5673894	-12.7666	-17.536	12.76663941
1000	1000	0.007	-0.008	69.28891	79.4828321	-10.1939	-14.712	10.1939221
1000	1000	0.007	-0.009	66.16658	74.4760279	-8.30945	-12.558	8.309447865
1000	1000	0.007	-0.01	63.38141	70.2651394	-6.88373	-10.861	6.883729398
1000	1000	0.008	-0.0005	333.9962	341.506019	-7.50982	-2.2485	7.509818742
1000	1000	0.008	-0.0006	304.72768	308.786548	-4.05887	-1.332	4.05886787
1000	1000	0.008	-0.0007	281.63353	283.580744	-1.94721	-0.6914	1.947214104
1000	1000	0.008	-0.0008	263.80583	263.415781	0.390049	0.14785	0.390049477
1000	1000	0.008	-0.0009	248.46	246.822622	1.637378	0.65901	1.637378146
1000	1000	0.008	-0.001	234.44087	232.867225	1.573645	0.67123	1.573645092
1000	1000	0.008	-0.002	161.35293	158.788254	2.564676	1.58948	2.56467603
1000	1000	0.008	-0.003	126.00421	126.924354	-0.92014	-0.7302	0.920144169
1000	1000	0.008	-0.004	105.36904	108.275047	-2.90601	-2.7579	2.906006472
1000	1000	0.008	-0.005	90.62706	95.7182958	-5.09124	-5.6178	5.091235801
1000	1000	0.008	-0.006	78.57345	86.5475878	-7.97414	-10.149	7.974137762
1000	1000	0.008	-0.007	69.28891	79.4828321	-10.1939	-14.712	10.1939221
1000	1000	0.008	-0.008	61.46079	73.8309377	-12.3701	-20.127	12.37014771
1000	1000	0.008	-0.009	58.90882	69.1801592	-10.2713	-17.436	10.27133916
1000	1000	0.008	-0.01	56.59358	65.2687001	-8.67512	-15.329	8.67512009
1000	1000	0.009	-0.0005	309.67681	319.993779	-10.317	-3.3315	10.31696849
1000	1000	0.009	-0.0006	282.77508	289.335382	-6.5603	-2.32	6.560301453
1000	1000	0.009	-0.0007	261.5437	265.717349	-4.17365	-1.5958	4.17364855
1000	1000	0.009	-0.0008	245.17537	246.822622	-1.64725	-0.6719	1.647251854
1000	1000	0.009	-0.0009	231.06966	231.274704	-0.20504	-0.0887	0.205043959
1000	1000	0.009	-0.001	218.73431	218.198389	0.535921	0.24501	0.535920817
1000	1000	0.009	-0.002	150.515	148.785821	1.729179	1.14884	1.729179019

1000	1000	0.009	-0.003	118.64474	118.929101	-0.28436	-0.2397	0.284360644
1000	1000	0.009	-0.004	99.26069	101.454555	-2.19387	-2.2102	2.193865223
1000	1000	0.009	-0.005	85.82721	89.6887828	-3.86157	-4.4992	3.861572814
1000	1000	0.009	-0.006	74.75854	81.0957585	-6.33722	-8.4769	6.337218516
1000	1000	0.009	-0.007	66.16658	74.4760279	-8.30945	-12.558	8.309447865
1000	1000	0.009	-0.008	58.90882	69.1801592	-10.2713	-17.436	10.27133916
1000	1000	0.009	-0.009	52.27614	64.8223437	-12.5462	-24	12.54620371
1000	1000	0.009	-0.01	50.36256	61.1572763	-10.7947	-21.434	10.79471634
1000	1000	0.01	-0.0005	288.5892	301.901271	-13.3121	-4.6128	13.31207074
1000	1000	0.01	-0.0006	264.27211	272.976305	-8.7042	-3.2936	8.704195173
1000	1000	0.01	-0.0007	244.91744	250.69364	-5.7762	-2.3584	5.776200243
1000	1000	0.01	-0.0008	229.57354	232.867225	-3.29368	-1.4347	3.293684908
1000	1000	0.01	-0.0009	215.59853	218.198389	-2.59986	-1.2059	2.599859183
1000	1000	0.01	-0.001	204.42598	205.861412	-1.43543	-0.7022	1.435431676
1000	1000	0.01	-0.002	141.73146	140.373443	1.358017	0.95816	1.35801701
1000	1000	0.01	-0.003	111.66277	112.204827	-0.54206	-0.4854	0.542057174
1000	1000	0.01	-0.004	93.93997	95.7182958	-1.77833	-1.893	1.778325801
1000	1000	0.01	-0.005	81.58586	84.6177624	-3.0319	-3.7162	3.031902352
1000	1000	0.01	-0.006	71.38001	76.5105893	-5.13058	-7.1877	5.130579247
1000	1000	0.01	-0.007	63.38142	70.2651394	-6.88372	-10.861	6.883719398
1000	1000	0.01	-0.008	56.59358	65.2687001	-8.67512	-15.329	8.67512009
1000	1000	0.01	-0.009	50.36256	61.1572763	-10.7947	-21.434	10.79471634
1000	1000	0.01	-0.01	46.16318	57.6994326	-11.5363	-24.99	11.53625256

Bijlage 24: Verificatie koepelformule voor grote constructies:

Om te controleren dat de formule ook nauwkeurig werkt voor grote constructies worden de waardes nu nog even in meters ingevuld. er blijkt dus dat als de constructie aan de gestelde eisen wordt voldaan, dat de uitkomsten inderdaad tot 5% nauwkeurig blijken te zijn. Voldoet er niet aan de eisen (bijvoorbeeld in 3, 5, 6, 7 en 8), dan kunnen er grote afwijkingen ontstaan tussen de uitkomst van ANSYS en de uitkomst van formule.

(1)

$P := 1000 : E := 1000 \cdot 10^6 : k1 := 0.1 : k2 := 0.1 : t := 0.1 : v := 0.4 :$

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

> $w2$

0.0004000325600

in ANSYS is een koepel met een grote van 20 meter gemaakt. met volgende parameters:

```
P  = 1e3                ! point load [N]
E  = 1e3                ! Young's modulus [N/mm2]
nu = 0.40               ! Poison's ratio [-]
t  = 100                ! thickness [mm]
d  = t                  ! diameter of the load area [mm]
k1 = 0.0001
k2 = 0.0001
g=10000                 ! radius of the paraboloid [mm]
h1 = 1                  ! centre element size [mm]
hn =100                 ! edge element size [mm]
```

ANSYS geeft de verplaatsing (in mm): w = 0.41454

Het verschil tussen de echte en de benadering van formule in procenten is dan:

$$\frac{(0.41454 - 0.40003256)}{0.41454} \cdot 100 = 3.49965$$

(2)

```
P  = 1e3          ! point load [N]
E  = 1e3          ! Young's modulus [N/mm2]
nu = 0.40         ! Poison's ratio [-]
t  = 100          ! thickness [mm]
d  = t   ! diameter of the load area [mm]
k1 = 0.00005
k2 = 0.00005
g=10000           ! radius of the paraboloid [mm]
h1 = 1 ! centre element size [mm]
hn =100           ! edge element size [mm]
```

> P := 1000 : E := 1000·10^6 : k1 := 0.05 : k2 := 0.05 : t := 0.1 : v := 0.4 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot (1 - 0.5 \cdot v^2);$$

0.0008000651200 (m)

Ansys geeft: 0.80474 mm. Het verschil met formule is dan:

> $\frac{(\ 0.80474 - 0.80006512)}{0.80474} \cdot 100$

0.5809180605

(3)

P = 10e3 ! point load [N]
E = 33e3 ! Young's modulus [N/mm2]
nu = 0.30 ! Poison's ratio [-]
t = 500 ! thickness [mm]
d = t ! diameter of the load area [mm]
k1 = 0.00001
k2 = 0.00001
g=10000 ! radius of the paraboloid [mm]
h1 = 1 ! centre element size [mm]
hn =100 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.01 : k2 := 0.01 : t := 0.5 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot (1 - 0.5 \cdot v^2);$$

0.00005033347755

> > $\frac{(\ 0.03798 - 0.05033348)}{0.03798} \cdot 100$

−32.52627699

(4)

P = 10e3 ! point load [N]

E = 33e3 ! Young's modulus [N/mm2]

nu = 0.30 ! Poison's ratio [-]

t = 500 ! thickness [mm]

d = t ! diameter of the load area [mm]

k1 = 0.00001

k2 = 0.00001

g=50000 ! radius of the paraboloid [mm]

h1 = 10 ! centre element size [mm]

hn =500 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.01 : k2 := 0.01 : t := 0.5 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.00005033347755

> $\frac{(\ 0.05070 - 0.05033348)}{0.05070} \cdot 100$

0.7229191321

(5)

P = 10e3 ! point load [N]

E = 33e3 ! Young's modulus [N/mm2]

nu = 0.30 ! Poison's ratio [-]

t = 500 ! thickness [mm]

d = t ! diameter of the load area [mm]

k1 = 0.000001

k2 = 0.000001

g=10000 ! radius of the paraboloid [mm]

h1 = 1 ! centre element size [mm]

hn =100 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.001 : k2 := 0.001 : t := 0.5 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.0005033347755

> $\frac{(\ 0.12991 - 0.5033348)}{0.12991} \cdot 100$

-287.4488492

(6)

P = 10e3 ! point load [N]
E = 33e3 ! Young's modulus [N/mm2]
nu = 0.30 ! Poison's ratio [-]
t = 500 ! thickness [mm]
d = t ! diameter of the load area [mm]
k1 = 0.000001 k2 = 0.000001
g=20000 ! radius of the paraboloid [mm]
h1 = 10 ! centre element size [mm]
hn =500 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.001 : k2 := 0.001 : t := 0.5 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.0005033347755

> $$\frac{(\quad 0.34856 - 0.5033348)}{0.34856} \cdot 100$$

-44.40406243

(7)

P = 10e3 ! point load [N]
E = 33e3 ! Young's modulus [N/mm2]
nu = 0.30 ! Poison's ratio [-]
t = 500 ! thickness [mm]
d = t ! diameter of the load area [mm]
k1 = 0.000001 k2 = 0.000001
g=50000 ! radius of the paraboloid [mm]
h1 = 10 ! centre element size [mm]
hn =500 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.001 : k2 := 0.001 : t := 0.5 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.0005033347755

> $$\frac{(\quad 0.41105 - 0.5033348)}{0.41105} \cdot 100$$

-22.45099136

(8)

P = 10e3 ! point load [N]
E = 33e3 ! Young's modulus [N/mm2]
nu = 0.30 ! Poison's ratio [-]
t = 1000 ! thickness [mm]
d = t ! diameter of the load area [mm]
k1 = 0.000005
k2 = 0.000005
g=25000 ! radius of the paraboloid [mm]
h1 = 10 ! centre element size [mm]
hn =500 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.005 : k2 := 0.005 : t := 1 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.00002516673878

> $$\frac{(\quad 0.01936 - 0.02516674)}{0.01936} \cdot 100$$

-29.99349174

(9)

P = 10e3 ! point load [N]
E = 33e3 ! Young's modulus [N/mm2]
nu = 0.30 ! Poison's ratio [-]
t = 1000 ! thickness [mm]
d = t ! diameter of the load area [mm]
k1 = 0.000005 k2 = 0.000005
g=100000 ! radius of the paraboloid [mm]
h1 = 100 ! centre element size [mm]
hn =2000 ! edge element size [mm]

> P := 10000 : E := 33000·10^6 : k1 := 0.005 : k2 := 0.005 : t := 1 : v := 0.3 :

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.00002516673878

$w2$

0.00002516673878

$$\frac{(\quad 0.02537 - 0.02516674)}{0.02537} \cdot 100$$

0.8011824990

(10)

P = 10e3 ! point load [N]

E = 33e3 ! Young's modulus [N/mm2]

nu = 0.30 ! Poison's ratio [-]

t = 1000 ! thickness [mm]

d = t ! diameter of the load area [mm]

k1 = 0.0000005 k2 = 0.0000005

g=200000 ! radius of the paraboloid [mm]

h1 = 100 ! centre element size [mm]

hn =2000 ! edge element size [mm]

> $P := 10000 : E := 33000 \cdot 10^6 : k1 := 0.0005 : k2 := 0.0005 : t := 1 : v := 0.3 :$

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.0002516673878

$w2$

0.0002516673878

$$\frac{(0.24438 - 0.2516674)}{0.24438} \cdot 100$$

−2.981995253

(11)

g= 10 m

voor een koepel met een g = 20 meter en dikte t=0.1 m

$P := 1000 : E := 1000 \cdot 10^6 : k1 := 0.05 : k2 := 0.05 : t := 0.1 : v := 0.4 :$

formule:

> $w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$

0.0008000651200

ANSYS:

0.00081461

> $\frac{(0.00081461 - 0.0008000651200)}{0.00081461} \cdot 100$

1.785502265

(12)

g=20 en t = 0.2 m

```
> P := 1000 : E := 1000·10^6 : k1 := 0.05 : k2 := 0.05 : t := 0.2 : v
      := 0.4 :
```

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.0002000162800

$$w2$$

0.0002000162800

$$\frac{(0.00020806 - 0.0002000162800)}{0.00020806} \cdot 100$$

3.866057868

(13)

g= 200 m t = 2 m

```
> P := 1000 : E := 1000·10^6 : k1 := 0.005 : k2 := 0.005 : t := 2 : v
      := 0.4 :
```

$$w2 := \frac{P}{E \cdot t^2} \cdot \frac{0.434818}{\sqrt{k1 \cdot k2}} \cdot \left(1 - 0.5 \cdot v^2\right);$$

0.00002000162800

$$w2$$

0.00002000162800

$$\frac{(0.00002081 - 0.00002000162800)}{0.00002081} \cdot 100$$

3.884536281