Sea Ice – Offshore Structure Interaction Steady State Downward Bending



Only recently, the offshore industry is exploring oil and gas fields in arctic regions. To produce these fields, offshore structures are needed in these icy regions. Obviously, the structures should withstand the huge ice forces. By applying a sloped structure wall, the ice fails in bending. This generally leads to lower ice loads, compared to failure modes in compression.

Up until now, sea ice bending is modelled quasi-statically. The motion of the ice is neglected and the deformations at the moment are assumed to be very small. Whether these assumptions can be justified is studied by modelling ice-structure interaction in steady state (see figure).

In steady state, the ice has adopted an equilibrium state without ice failure. The model is time independent and large deformations are imposed. The ice is given a constant velocity



Steady state sea ice-offshore structure interaction.

The model is analyzed with the help of numerical procedures, implemented in the program Fortran. The importance of both the ice and structure properties is identified. By taking the strength of sea ice into account, the validity of the model is studied. As a first step to further research, a promising transient interaction model is developed.

I kindly invite you to the presentation of my Master thesis, **Thursday the 24th of August at 16:00 pm in lecture room G.**

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