

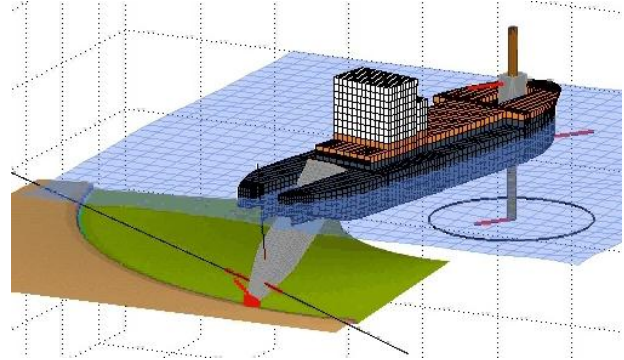
Model Order Reduction for coupled ship hydrodynamic and multibody dynamic equations

Background

The operations that are required to work cost-effective in the offshore and dredging industry are increasingly complex. Therefore the design of efficient dredging and offshore ships and equipment requires proper dynamic and multiphysical simulations of those operations.

There MTI, the R&D Department of IHC Merwede has developed the software program DODO: Dynamic Operations in Dredging and Offshore. This program combines the three main physical fields seen during those operations:

- Hydromechanics and ship motions
- Multibody dynamics of equipment
- Soil mechanics at the sea floor



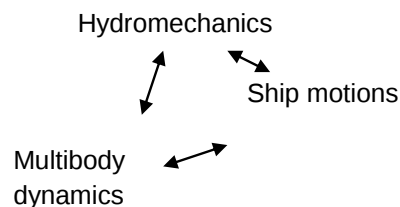
Because the output of a hydrodynamic simulation depends highly non-linear on the input parameter and the multibody dynamic model itself is non-linear these simulation tend to be time consuming. Therefore a Model Order Reduction (MOR) approach is considered.

Goal

The goal of the project is develop a MOR framework for reducing part of the coupled DODO problem:

- Ship hydromechanics
- Multibody dynamics

With respect to the input non-linearity in the ship hydrodynamic equations.



Method

The suggested strategy would be to adapt a method used for aero-elastic flutter problems in aerospace applications for this problem which essentially uses the following strategy:

- Build a database of non-linear results
- Interpolate between these results

However this sounds more simple than it is, because determining which situations to put in the database and how to interpolate between those points is not trivial.

Contact

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