Maritime DTU
Center for Maritime Activities

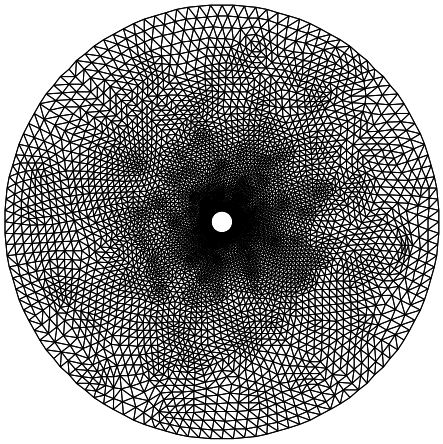
Further development of DTU in-house code SEAROS for 2nd order wave loads analysis

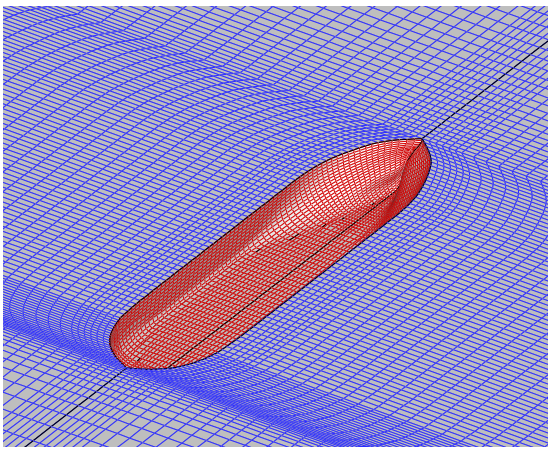
Type of project: MSc

Project description:
The **SE**cond order w**A**ve loads and **R**esp**O**nses Analysis of marine **S**tructures (SEAROS) code was developed based on a new mathematical formulation of the seakeeping problem in a body-fixed coordinate system (Shao & Faltinsen, 2012). It avoids some well-known numerical difficulties in the traditional formulations, which still exist in most of the commercial softwares in marine hydrodynamics. One example of these difficulties is the so-called m-term in seakeeping analysis for ships and offshore structures. The SEAROS code, based on a 12-node 3rd order boundary element method and implemented in Fortran 90, has also been applied by DNV GL in commercial projects in seakeeping and added resistance calculations. To make the code more flexible so that it can be used in other research activities (e.g. floating wind turbine & Aquaculture) and possibly in more industrial applications, there are a few new improvements and implementations planned for the near future.

Among others, the current project aims to improve the existing code by
1) Introducing unstructured meshes on both the free surface and the structural boundaries
2) Implementing stabilized streamline integration for the convective terms in the free surface conditions

Much of initial work has recently been done by Yanlin Shao at DTU for the new developments and he would like to invite motivated students who are interested in deepening their knowledge in general marine hydrodynamics / object-oriented programming / numerical algrithoms to work together with him.





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