

PRODUCTIVE SECTOR: Logistics and transport

PROBLEM DESCRIPTION

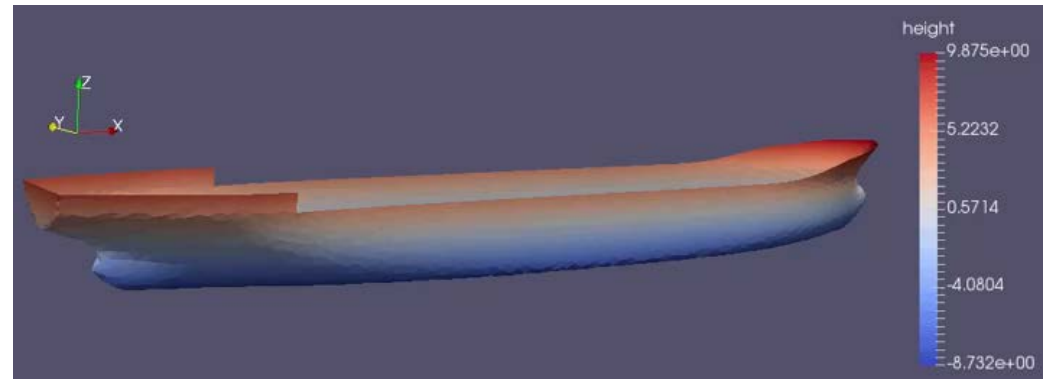
Development of a vessel draft prediction tool for the optimization of port management.

CHALLENGES AND GOALS

- ✓ Identification of the most relevant hydrodynamic phenomena under **constant environmental conditions**.
- ✓ Mathematical modelling of the hydrostatic and hydrodynamic problems and its numerical resolution to obtain the **dynamic draft of a ship**.

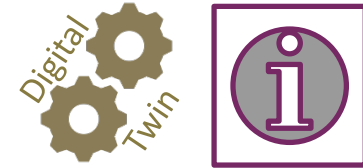
MATHEMATICAL AND COMPUTATIONAL METHODS

- ✓ Hydrodynamic model: linear, incompressible fluids and use of velocity potentials.
- ✓ Physical problem with unbounded domain: PML technique (Perfectly Matched Layers)
- ✓ Computational domain: Automatic generation of geometries and meshes



Height with respect to the sea free surface at the hydrostatic equilibrium position, plotted on the vessel hull

Results and benefits



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- ✓ The computation of the dynamic draft using the ShipFEM code is efficient and accurate.
- ✓ This code has been included in the port consulting tool: i4cast.
- ✓ Its integration leads to a more complete and competitive tool in the market.



- ✓ An intelligent system that helps in making decisions through monitoring
- ✓ Prediction of oceanic and climatic conditions
- ✓ Simulation of the influence of environmental conditions on port operations in each vessel