An SPH Model for Prediction of Oil Slick Diameter in the Gravity-Inertial Spreading Phase

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ABSTRACT

This paper presents the implementation of the SPH Lagrangian method for prediction of oil slick diameter in the gravity-inertial spreading. Computer codes that predict the slick diameter generally use hybrid models (Eulerian-Lagrangian), and simulations start from the end of the first phase (gravity-inertial), in which the oil slick diameter is given by Fay's equations [1, 2]. Fay adjusted curves to oil spreading experimental data on a calm sea condition aiming to estimate the oil slick diameter as a time function, after the spill occurrence.

The mathematical modelling in this work is based on the Navier-Stokes equations, for incompressible Newtonian fluids. In the boundary treatment, a model for the collisions between the particles has been used, with the definition of an energy restitution coefficient [3].

At the end of the first stage of the spill, the numerical results obtained by SPH simulations show agreement with the solution obtained from Fay's equations.

REFERENCES

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