

M2 research project
Surface waves with random bottom

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Description of the project :

Waves on the water surface are modeled with the use of different asymptotic equations, depending on the regime which is considered. In the case of long, weakly nonlinear and dispersive waves, the equations for the 1-D waves are of Boussinesq or Korteweg-de Vries type, with variable coefficients if the topography is not uniform. Recently, some asymptotic models have been obtained in the case of perturbations of the topography on scales much smaller than the scales of the waves under consideration, and if the bottom is modeled, e.g., by a random process.

The aim of the project will be to compare numerically the solutions of the asymptotic model and those of the original water wave model (free surface Euler equations); these later solutions will be computed with the help of a method recently developed by P. Guyenne and D. Nicholls. Some other regimes will also possibly be studied.

Location : Centre de Mathématiques Appliquées, Ecole Polytechnique

Requirements : The student must be motivated by modeling problems and have some knowledge in numerical analysis; basic knowledge in probability would be appreciated, but is not compulsory.