

# Modelling drag and inertia forces on vegetation with OpenFOAM<sup>®</sup>

## Context

Coastal vegetation attenuates waves, currents and promotes sediment accretion. Its function as shoreline defence has gained strong interest during the last years, since it may offer sustainable and cost-effective solutions to coastal protection problems.

Wave energy dissipation by vegetation is modelled as the work done by fluid forces acting on the plants, often parameterized using empirical drag ( $c_D$ ) and inertia ( $c_M$ ) coefficients, which depend on both wave and plant properties.

Choosing the right values of the  $c_D$  and  $c_M$  is thus essential for accurate predictions of wave dissipation by vegetation.

## Project description

CFD can be a useful tool to study the hydrodynamic forces under high vegetation densities. The aim of the present MSc project is to model a groups of cylinders with OpenFOAM<sup>®</sup>, under different wave conditions and varying number of cylinders, in order to study the behaviour  $c_D$  and  $c_M$ . Inertia forces are often disregarded in wave dissipation models, but they may have a more important role for denser vegetation. This question will be also addressed with the model.

### Starting date:

From May 2019

### Committee:

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### Information:

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