INTERACT-CorPower – Assessment of interaction effects between wave energy converters

Background and motivation

A few full-scale single-unit wave energy converter (WEC) prototypes have been deployed in the ocean. Further commercialisation requires the installation of many WECs in array systems. The upscaling to array systems is a challenge due to the interaction effects between WECs and their subcomponents. New design and assessment methods are needed which together with advanced simulation models can be used to design wave energy parks accounting for interaction effects for optimum system performance e.g. power, fatigue life, levelised cost of electricity (LCoE).

Objectives and goals of the project

This thesis will study CorPower’s WEC concept (see the figures) by numerical simulations of different array configurations. The hydrodynamic performance and electricity production will be compared for a variety of installation and operation conditions, e.g., bathymetry, wave scatter diagram, and layout of the wave energy park. Finally, since the layout of a wave energy park depends on the installation site’s specific conditions it is of value to have a tool that easily/quickly can help an engineer design the wave energy park. The thesis project should propose a simple methodology that can be used in the preliminary design of wave energy parks.

Methods and tools

The DNV-GL software SESAM will be used, and a single WEC unit model developed at the division can be used at the beginning of the project. This model can be copied to form the wanted size and shape of the WEC park that will be analysed. The thesis should be written in Word using a template provided by the department.

Industry partner: CorPower (https://corpowerocean.com).

Number of students: 2 students is recommended.

Prerequisites: (recommended) some experience from CFD.

Tasks

- Literature study.
- Collection of Metocean data for candidates to installation sites to be used in the numerical simulations.
- Definition of wave energy parks suitable for CorPower’s WEC and installation requirements.
- Frequency-domain simulations.
- Fully coupled simulations in the time-domain.
- Parametric studies.
- Development of a simple methodology for the preliminary design of wave energy parks.
- Write a thesis report and present it at a public seminar.

Contacts

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