PROJECT /MASTER THESIS
HIWI-POSITION

27/08/2020

Fluiddynamik und Schiffstheorie

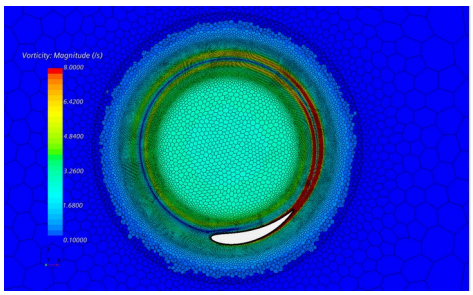
TUHH
Technische Universität Hamburg

LiftWEC

The Institute for Fluid Dynamics and Ship Theory is offering the following topic for a thesis:

Design optimization of lift-based wave energy converter based on potential flow theory simulations

What is it about?



The EU-funded project LiftWEC aims at developing a novel type of wave energy converter. Until 2022, the 10 partners will address all aspects of a holistic WEC design in order to demonstrate the capability of the concept.
Within the consortium, the Institute of Fluid Dynamics and Ship Theory leads all tasks related to the hydrodynamic modelling of the device.
The general ideal consists of an actively pitched set of hydrofoils, rotating underneath the free surface. It exploits the orbital water particle trajectories beneath surface waves to induce a continuous motion, which significantly enhances the potential of power-take off for the generation of electric energy, compared to previous types of wave energy converters. The main challenges within the project consist in developing a control algorithm which is capable of handling the unpredictable nature of irregular ocean sea states as well as finding a structural design able to withstand the extreme conditions of the offshore environment.

In this work, the non-linear potential flow code *pan*MARE, which has been extended and validated for basic LiftWEC configurations, shall be applied to investigate the performance of the device in regular and irregular waves. In a second step, the design of the device as well as its control capabilities shall be optimized to maximize the possible power capture in realistic sea states.

What will be provided

We will provide you with training in the basics of potential flow theory, as well as guide you through the first steps of scientific post-processing, uncertainty analysis etc. In case your application is suitable for a Hiwi-contract, you will receive the standard compensation.
Work can be conducted locally or remotely, with regular feedback to check progress and discuss challenges.

Certain knowledge that is necessary?

We expect advanced knowledge about numerical methods in fluid dynamics (Master level) or a high-level of experience in python3, preferably both. The student should be able to work independently and in a structured way.

Interested?

Feel free to send us an email or to visit us in the office (with appropriate distance).

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