DYNAMICS OF MOORED FLOATING BODIES UNDER IRREGULAR WAVES

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Program:

Wave dynamics (8h): Bernoulli theorem (irrotational form). Airy theory: progressive and evanescent solutions. Diffraction problem. Outline of finite amplitude wave dynamics: steep wave and shallow water wave approaches. Wave irregularity.

Mooring system (4h): Catenary. Static and dynamic behaviour of chains. Snapping conditions. Synthetic and metallic tethers. Umbilical. Dead body anchor.

Floating body dynamics (4h): 2DoF Problem of moored rigid body dynamics under regular and irregular waves. Time and frequency-based approaches.

Numerical modelling (4h): Application of a solver of the linear diffraction problem to an example case.

References:

Minutes of the lessons

Examination and grading:

Oral exam (2 questions randomly selected from a list of questions given at the end of each lesson) or presentation of an exercise (numerical simulation of a simplified floater)

Other course details:

The course aims at giving the basic knowledge of mooring cable dynamics for the simulation of the motion of free and moored floating structures especially where the wave force is of primary importance. A prerequisites is a basic knowledge of fluid mechanics, rigid body dynamics, Fourier transforms, programming languages.