Interactions between multiple bodies oscillating at the water surface.

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Floating offshore wind, wave, and tidal energy are potentially important components of the future renewable energy landscape. All of these involve floating structures which both interact with and create water waves. This project aims to develop mathematical theory to describe the interactions between multiple bodies, and their resultant wave fields, oscillating at the water surface. Mathematical modelling and analysis will be used in conjunction with optimisation techniques to develop a framework where floating bodies can be used to stabilise each other, or to reduce oscillations in a variety of weather conditions.

Techniques involved: mathematical modelling, asymptotic analysis, numerical solutions to PDE's, numerical optimisation techniques, variational calculus, optimal control theory.