Large-amplitude steady rotational water waves

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Abstract

The construction of large-amplitude steady rotational water waves with an overhanging wave profile is one of the most difficult problems in the field. In this talk we outline two different approaches that have been used to construct waves with constant vorticity which may overhang. The first relies on rewriting the problem as a nonlocal scalar equation of Babenko type on the surface of a fixed domain. For the second, we present a novel reformulation of the problem as an elliptic system of two scalar functions: one describing the conformal map of the fluid region and the other the flow beneath the wave. The latter is a joint work with Miles H. Wheeler (University of Bath).