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Steady rotational water waves near stagnation

Two-dimensional finite-depth periodic water waves with general vorticity and large amplitude are computed. The mathematical formulation and numerical method that allow us to compute a continuum of such waves with arbitrary vorticity are described. The computations in the case of constant vorticity show that there are only two points of stagnation and that the qualitative nature of the free surface depend on the vorticity. For variable vorticity, modelling surface shears and undertows, phenomena such as internal stagnation can occur.

This is joint work with Walter Strauss (Brown University).