On the existence and instability of solitary water waves with a finite dipole

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Abstract

In this talk, we investigate the existence and instability of two-dimensional traveling capillary-gravity water waves with a finite dipole. In particular, we consider the case where the fluid has infinite depth, and the vorticity is a sum of two weighted δ-functions. Using the implicit function theorem, we can construct a family of solitary waves for the finite dipole problem. Our main result is that this family is orbitally unstable. This is proved using a modification of the Grillakis–Shatah–Strauss method recently introduced by Varholm, Wahlén, and Walsh.