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Stability of multiple Lamb dipoles

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Classical variational approach of maximizing the kinetic energy under constraints provides nonlinear stability of the maximizing vortex configuration in various settings, but this approach fails to handle the situations where the vorticity is concentrated at multiple points in the fluid domain. This is simply because such configurations are not even local kinetic energy maximizers, even when we restrict the admissible class using all known coercive conserved quantities. We present results on nonlinear stability of superpositions of several Lamb dipoles, obtained by combining classical variational principle with dynamical bootstrapping schemes. This is based on several joint works with Ken Abe, Kyudong Choi, Guolin Qin, and Yao Yao.

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