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On point vortex equilibria in a bounded circular domain GEORGES CHAMOUN, Technical University of Denmark, MARK STREMLER, Virginia Tech — We develop a general and systematic approach for solving point vortex equilibria in a bounded domain. The motivation for this work is that most, if not all, vortex equilibria in the physical world occur within a confined container filled with a finite amount of fluid. However, most of the existing models for vortex equilibria are in the unbounded plane. Furthermore, the few manuscripts that analyze vortex equilibria in the presence of a solid boundary present results for very simple configurations. We use the Hamiltonian point vortex model and the circle theorem for the equations of motion. We formulate the problem as one in linear algebra with the positions of the vortices given, and we use singular value decomposition to determine the vortex strengths necessary for relative equilibrium. We illustrate the feasibility of this technique with a few examples that are physically motivated from experiments, and we comment on linear stability.

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