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**Alanna Hoyer-Leitzel\*** (ahoyerle@mtholyoke.edu) and **Anna M. Barry**. *Existence and stability of relative equilibria with a dominant vortex.*

Point vortex models propose that the motion of small-core, well-separated vortices in a two-dimensional fluid can be described by a set of ordinary differential equations that treats each vortex as a single point. This is commonly known as the  $n$ -vortex problem. In this paper, we analyze existence and stability of point vortex relative equilibria with one dominant vortex and  $N$  vortices with infinitesimal circulation. We show that the problem can be reduced to an infinitesimal circulation limit, and that both existence and stability are characterized by properties of critical points of a particular real-valued function of  $N$  angular variables. We use these results to prove that symmetric configurations require equality of two circulation parameters in the  $(1 + 3)$ -vortex problem, and we show that there can be stable asymmetric configurations. (Received September 19, 2015)