

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Sorting Category: 51. (T)

Linear stability of relative equilibria of identical point vortices¹ HASSAN AREF², Technical University of Denmark, Lyngby, Denmark — The linear stability analysis of relative equilibria of N identical point vortices is reconsidered. First, we show that the problem can be reduced to evaluating the eigenvalues and eigenvectors of a certain Hermitean matrix. Then, the exact solution of the linear stability problem for the collinear relative equilibria is given following work by Calogero and Bruschi from the late 1970's. We consider the possibility of extending these largely algebraic results to general configurations, and we explore the class of relative equilibria for which such calculations may be carried through. The regular polygons certainly fall in this class, but the known families of nested, regular polygons may also allow at least a partial analytical stability analysis. The role of the generating polynomial in stability calculations is explored, and also the link between stability of a relative equilibrium and the existence of an axis of symmetry of the configuration. Such a link was suggested to the author by D. L. Vainchtein several years ago.

¹Supported by a Niels Bohr Visiting Professorship sponsored by the Danish National Research Foundation.

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Prefer Oral Session
 Prefer Poster Session

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Date submitted: 02 Aug 2008

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