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*Polygonal relative equilibria in the  $N$ -vortex problem*

The  $N$ -vortex problem consists in the study of the solutions of the equations of Helmholtz which describe the motion of a planar incompressible fluid.

We are interested in relative equilibria made of regular polygons. We show that a relative equilibrium with one polygon with more than three vortices requires equal vorticities. This result is the analogous of Perko–Walter’s one in celestial mechanics. We compute the relative equilibria with two polygons and the same vorticity on each polygon. We also study the corresponding restricted problem.

This work adapts and generalizes results of Aref–Van Buren (two polygons with the same vorticity for all the vortices) and Moeckel–Simó (two polygons in celestial mechanics).

This is a joint work with Ernesto Lacomba and Ernesto Pérez-Chavela.