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Ernesto A Lacomba* (lace@xanum.uam.mx), Mathematics Department, University Autonoma Metropolitana, Iztapalapa, Av San Rafael Atlixco 186, 09340 Mexico, DF, Mexico, and **Martin Celli** and **Ernesto Pérez-Chavela**. *Relative equilibria with one or two concentric polygons in the N -vortex problem.*

Helmholtz's equations provide the motion of a system of N vortices which describes a planar incompressible fluid with zero viscosity. A relative equilibrium is a particular solution of these equations for which the distances between the vortices are invariant during the motion. In this article, we first show that a relative equilibrium formed of a regular polygon and a possible vortex at the center, with more than three vertices on the polygon (two if there is a vortex at the center), requires equal vorticities on the polygon. We also provide an 8-vortex configuration, formed of two concentric squares making an angle of 45 degrees, with uniform vorticity on each square, which is in relative equilibrium for any value of the vorticities. Then we study in general the existence of relative equilibria consisting of two concentric polygons. (Received August 30, 2011)