

1060-37-32

**Mohamed I Jamalooden\*** (mjamaloo@ggc.usg.edu), Georgia Gwinnet College, School of Science and Technology, 1000 University Center Lan, Lawrenceville, GA 30043. *On the motion of point vortices on the sphere and hyperbolic sphere.* Preliminary report.

We present results for integrable point vortex motion on the sphere and hyperbolic sphere. We show that the only collapsing configurations of the three-vortex problem on the sphere are self-similar. We study the simplest four-vortex problem on the sphere, one analogous to the plane, and for which self-similar four-vortex collapsing configurations are admissible, and show that on the sphere these do not admit collapse. We study numerically the four-vortex relative equations and report that we are unable to find four-vortex self-similar collapse. We present explicit solutions of the three-vortex problem using quadrature and provide local bifurcation properties of these. We comment on the integrable four-vortex problem proving the integrability of "collinear" four-vortex problems as well as present, informally, special relative equilibrium (vortex crystals) solutions of these configurations we found previously using other methods. We present some preliminary results on similar work with vortices on the hyperbolic sphere. Our results include the complete integration of the three-vortex collapse problem on the hyperbolic sphere, and draw parallels with the similar collapse of three vortices on the sphere and plane using asymptotics.[Joint work with Paul K. Newton] (Received February 24, 2010)