New Integrable System in Problem of Motion of Point Vortices on a Sphere

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Earlier investigations (dated back to E. Zermelo) deal with the problem of motion and integrability of three point vortices over a sphere. We consider new integrable problem of motion of six point vortices moving over a sphere. For the new problem, first integrals are found as well as the method of order reduction to one degree of freedom is applied. Qualitative and bifurcation analysis of the system is carried out, which allows us to point out a new class of isosceles configurations (along with collinear and equilateral ones). This class of solutions can be described analytically, and thus conditions of stability and bifurcation can be obtained explicitly.