Symplectic integrators for Hamiltonian spin systems

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ABSTRACT

In this talk I will discuss a novel symplectic integrator for Hamiltonian systems on direct products of 2–spheres. Such systems are called *spin systems* and occur frequently in physics; examples include the free rigid body, point vortex dynamics on the sphere, the classical Heisenberg spin chain, and the Landau-Lifshitz equation of micromagnetics. The new method works for all Hamiltonians and is $O(3)$–equivariant. I will discuss the underlying Riemannian and symplectic geometry, by explaining how the method is related to the classical midpoint method and to the recent concept of collective symplectic integrators.