

Some qualitative aspects of symplectic numerical analysis

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Symplectic numerical methods are the discretization methods with step-transition operators preserving the symplectic structure of the phase space of Hamiltonian systems whenever the methods apply to such systems. The special consideration as to preserve symplecticity of Hamiltonian systems has been proved to be a remarkably great idea. Further generalizations to other structures and other geometric properties, intrinsic to the concerned systems, have been investigated extensively during the last decade. "Geometric numerical integration", as titled by E. Hairer, Ch. Lubich and G. Wanner in their talks and coauthored monograph to be published, has grown an active research area and attracted many researchers.

Geometric consideration calls for qualitative analysis. Numerical simulations have shown the interesting match between dynamics of Hamiltonian systems and their symplectic numerical integration ones. In this talk I will report some results in this respect, which are strict in mathematics.