

Integrability of Kahan discretisations

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A common problem of several discretisation methods of differential equations is that when they are applied to completely integrable Hamiltonian systems, they deliver discrete systems that are no longer integrable themselves. This is the so-called problem of integrable discretisation. The recently rediscovered Kahan or Hirota-Kimura discretisation is a method for discretising quadratic vector fields into birational maps that has surprising properties: in a certain number of examples, such as in the Euler and Lagrange tops, it gives discretisations that are also integrable.

In this talk we introduce this discretisation method and explain some of its main properties and results in several examples.