
Asymptotic Stability of the Toda m -soliton

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Abstract

We prove that multi-soliton solutions of the Toda lattice are both linearly and nonlinearly stable. Our proof uses neither the inverse spectral method nor the Lax pair of the model but instead studies the linearization of the Bäcklund transformation which links the $(m-1)$ -soliton solution to the m -soliton solution. We use this to construct a conjugation between the Toda flow linearized about an m -soliton solution and the Toda flow linearized about the zero solution, whose stability properties can be determined by explicit calculation. This is joint work with Nick Benes and Aaron Hoffman.

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