Nonlinear Sciences > Exactly Solvable and Integrable Systems

Complete Integrability for Hamiltonian Systems with a Cone Potential

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It is known that, if a point in R^n is driven by a bounded below potential V, whose gradient is always in a closed convex cone which contains no lines, then the velocity has a finite limit as time goes to $+\infty$.
The components of the asymptotic velocity, as functions of the initial data, are trivially constants of motion. We find sufficient conditions for these functions to be C^k ($2\le k \le+\infty$) first integrals, independent and pairwise in involution.
In this way we construct a large class of completely integrable systems. We can deal with very different asymptotic behaviours of the potential and we have persistence of the integrability under any small perturbation of the potential in an arbitrary compact set.

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