Mathematics > Dynamical Systems

On a unified formulation of completely integrable systems

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The purpose of this article is to show that a $\mathcal{C}^1$ differential system on $\R^n$ which admits a set of $n-1$ independent $\mathcal{C}^2$ conservation laws defined on an open subset $\Omega\subseteq \R^n$, is essentially $\mathcal{C}^1$ equivalent on an open and dense subset of Ω, with the linear differential system $u^\prime_1=u_1, \ u^\prime_2=u_2,..., \ u^\prime_n=u_n$. The main results are illustrated in the case of two concrete dynamical systems, namely the three dimensional Lotka-Volterra system, and respectively the Euler equations from the free rigid body dynamics.

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