

**Magri, F.**

**Eight lectures on integrable systems.** Written in collaboration with **P. Casati, G. Falqui and M. Pedroni.** (English) [\[Zbl 0907.58031\]](#)

Kosmann-Schwarzbach, Yvette (ed.) et al., Integrability of nonlinear systems. Proceedings of the CIMPA school, Pondicherry Univ., India, January 8–26, 1996. Berlin: Springer. Lect. Notes Phys. 495, 256-296 (1997).

This is an introduction to the theory of integrable systems from the viewpoint of Poisson manifolds. This leads to bi-Hamiltonian manifolds and an elegant theory due to Casati, Falqui, Magri, and Pedroni. One produces Gelfand-Dickey (GD) manifolds via Marsden-Ratiu reduction from a class of Poisson manifolds relevant to the theory of soliton equations. These are phase spaces when the soliton equations are defined. Casimir functions and GD equations are developed and relations between Kadomtsev-Petviashvili (KP) and GD theories are indicated. KP equations arise as local conservation laws associated with GD equations. One also develops extended Lax representations and Poisson-Nijenhuis manifolds in connection with Calogero systems.

This work is quite fascinating.

For the entire collection see [\[Zbl 0879.00077\]](#).

Reviewer: [Robert Carroll \(Urbana\)](#)

**MSC:**

- [37J35](#) Completely integrable finite-dimensional Hamiltonian systems, integration methods, integrability tests
- [37K10](#) Completely integrable infinite-dimensional Hamiltonian and Lagrangian systems, integration methods, integrability tests, integrable hierarchies (KdV, KP, Toda, etc.)
- [35Q51](#) Soliton equations
- [53D17](#) Poisson manifolds; Poisson groupoids and algebroids

Cited in <b>2</b> Reviews Cited in <b>20</b> Documents
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**Keywords:**

[Gelfand-Dickey manifolds](#); [integrable systems](#); [Poisson manifolds](#); [bihamiltonian manifolds](#); [soliton equations](#); [Casimir functions](#); [KP equations](#); [extended Lax representations](#); [Poisson-Nijenhuis manifolds](#); [Calogero systems](#)