

ANNUNCIO DI MINICORSO

Corso di Dottorato nell'ambito del Dottorato in Modelli Matematici per l'Ingegneria, Elettromagnetismo e Nanoscienze, Coord. Prof. Fabio Camilli,
Universita' di Roma La Sapienza, Dip.S.B.A.I., 16 Via A. Scarpa, Roma.

INTEGRABLE SYSTEMS - METHODS OF MATHEMATICAL PHYSICS IN INTERACTION
by Prof. Cornelia Schiebold,
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Integrable systems in infinite dimension refer to an area in mathematical physics which is devoted to the study of a certain group of partial differential equations, many of them soliton equations like the classic Korteweg-de Vries equation and the nonlinear Schrödinger equation. One of the striking features is the existence of solutions with particle character, called solitons, remarkable in view of nonlinearity of the governing equations. Methodologically, integrable systems are a meeting point (melting pan) for methods from very diverse parts of mathematics. The main idea of this mini course is to highlight interactions of some of the main approaches to integrable systems, the inverse scattering method and an operator theoretic approach in the first place, and symmetry methods like Bäcklund transformations, recursion operators and hierarchies to a minor extent.

Throughout we will emphasise the recent topic of non-commutative integrable systems, like vector- and matrix soliton equations, where many fundamental questions are still open. Notably, the construction of solutions is not interesting only under the mathematical viewpoint, but also under the physical one. Indeed, very important applications of soliton equations are in nonlinear optics, for instance.

The selection is of course guided by the interests of not only of the lecturer, but also of the PhD students. The idea behind the many results and the research projects in the present collaboration (joint works by Sandra Carillo, Cornelia Schiebold, and also, in recent works, Mauro Lo Schiavo, University of Roma La Sapienza).

The lectures are going to be reasonably self-contained. Some familiarity with PDE's and functional analysis is certainly helpful, but not required. An overview on the basic notions used during the course are provided when needed.

AULA 1B1 PAL RM002

Lectures 1-2 March 7 time 12-14

Lectures 3-4 March 14 time 12-14

Lectures 5-6 March 21 time 12-14