Comparison principles for constrained subharmonics

Prof. Kevin Ray Payne, 25 ore – 5 cfu

Introduce the recent notion of constrained viscosity solutions (and subsolutions) for constant coefficient nonlinear potential theory and partial differential equations. Indicate how fundamental properties of the Dirichlet duality of Harvey and Lawson combined with the presence of suitable monotonicity cones leads easily to comparison principles. Provide the necessary background in convex ananysis to treat solutions with low regularity (continuity or mere semicontinuity).

Inizio: febbraio 2019

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Complex abelian varieties and elliptic curves

Dr. Jeff Yealton, 25 ore – 5 cfu

We will present the theory of complex abelian varieties as given by Mumford and Rosen, with a particular emphasis on complex elliptic curves. We will then give an introduction to the arithmetic of elliptic curves. At the end of the course, each student will be required to present a talk on an extra topic related to the course material.

Inizio: febbraio 2019

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Stochastic Geometric Methods for Complex Systems

Prof. Alessandra Micheletti, 25 ore – 5 cfu

The course will introduce stochastic geometric methods for the modelling and the statistical analysis of random shapes. The course will include the shape theory of Kendall, the theory of random functions and elements of functional statistics and topological data analysis. The course will be complemented with computer labs, based on the software R, where case studies will be submitted to the students, ranging in different areas of applications, from shape recognition from images, to the search of underlying structures into graphs and networks.

Inizio: giugno 2019

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Model reduction and large-scale linear algebra

Proff. Michiel Hochstenbach e Wil Schilders, 25 ore – 5 cfu

The course will be focussed on advanced linear algebra and model reduction methods. The topics will include: Numerical Linear Algebra (general introduction to many topics and their relationships; SVD, PCA and variants; relation to feature extraction; Krylov methods for large-scale systems (linear systems, eigenvalue problems, and generalized problems); model reduction methods (large-scale and Krylov model reduction, nonlinear and data-driven model reduction). The course will include lab sessions on examples and case studies.

Inizio: marzo 2019