SEMINARIO DI GEOMETRIA E ALGEBRA

UNIBA - POLIBA

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Dipartimento di Matematica UniBa, Aula IX, primo piano

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An Introduction to Cauchy-Riemann Geometry

Abstract. This talk offers an introductory exploration of Cauchy-Riemann Geometry (or CR geometry), a mathematical area bridging Differential Geometry, Complex Analysis and Partial Differential Equations theory. Starting from the so-called tangential Cauchy-Riemann equations, we will introduce the foundational concepts of CR structures, which are particular complex subbundles on real manifolds. We will then focus on the interplay between CR geometry and other branches of Differential Geometry such as contact, Sub-Riemannian and Lorentzian geometries. Finally we will consider the counterpart of harmonic maps within the CR category, namely subelliptic harmonic maps. The principal part of the Euler-Lagrange equations system describing these maps is the sublaplacian, a second order elliptic degenerate yet subelliptic operator: this will bring into the picture the relevance of subelliptic PDEs, which play within CR geometry the same strong role held by elliptic theory in the Riemannian one. Some of the results presented in this last section are part of a joint work with S. Dragomir and E. Loubeau.

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