SEMINARS

(matematika mugaz bestalde)

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10:00 Maria Stella GELLI, Università di Pisa, Italy

A BONNESEN TYPE INEQUALITY INVOLVING THE SPHERICAL DEVIATION

I will present a new version of the quantitative isoperimetric inequality replacing the Fraenkel asimmetry with a stronger notion of distance between sets (the spherical deviation). More precisely, the spherical deviation measures the best way to cover a given set E of finite measure with a ball having the same measure. The aim is to estimate this quantity in terms of the oscillation in perimeter (the perimeter deficit) selecying at the same time the optimal form of the function f of the perimeter deficit for which the inequality holds(f would depend only on the dimension n).
Due to the pioneering work by Bonnesen in 1924 this kind of estimates are called "Bonnesen type inequalities". The interest in the estimate quoted above arises from models in Applied Sciences (such as tomography and so on). Nevertheless it can be easily seen that such an inequality cannot be expected to hold for the general class of sets with finite perimeter (neither for "big" deficits).
Hence, in view of applying this result in different fields, we select a suitable class of sets, rich enough to allow implementation but not asuming a priori regularity, for which the result can be proved.
Note that for regular starshaped sets the estimate can be rephrased as a functional inequality, thus as a step of the proof we generalize a result obtained by Fuglede in 1989.

11:00 Cherif.AMROUCHE, Université de Pau et des Pays de l'Adour, France

ELLIPTIC PROBLEMS IN THE HALF-SPACE

The aim of this talk is the resolution of some elliptical prolems in the half-space $\mathbb{R}^N_+$ with $N \geq 2$. Using the Dirichlet and Neumann problems for the Laplace operator [1]- [2], we give existence, uniqueness and regularity results in L^p theory for the biharmonic and Stokes problems [3]-[6]. For that, we consider data and give solutions which live in weighted Sobolev spaces. We assume that the boundary conditions are nonhomogeneous and we also take them in weighted Sobolev spaces. An important aspect of this study is the case of singular boundary conditions and the very weak solutions which correspond to it. We also treat the question of non standard boundary conditions. A part of this work is devoted to the study of the reflection principles for the biharmonic and Stokes operators. We give weak formulations of these principles with the aim of getting the kernels in some distribution spaces. In a second part, we obtain new estimates for L^1 and L^N vector fields, which yield in particular improved estimates for the solution of elliptic systems in the half-space (see [7]-[10]).