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SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 29 de Setembro (quinta-feira), às 14h30, na sala 6.2.33

When the Boundary Point Principle does not hold?

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Abstract:

The influence of the properties of a domain on the behavior of a solution is a significant topic in the qualitative analysis of partial differential equations. The important result in this field is the Boundary Point Principle, known also as the Hopf-Oleinik lemma. This celebrated Principle states:

Let u be a nonconstant solution to a second-order homogeneous uniformly elliptic nondivergence equation with bounded measurable coefficients, and let u attain its extremum at a point x^0 located on the boundary of a domain $\Omega \subset \mathbb{R}^n$. Then $(\partial u / \partial \mathbf{n})(x^0)$ is necessarily nonzero provided that $\partial\Omega$ satisfies the proper assumptions at x^0 .

We are interested in the minimal requirements on $\partial\Omega$ at x^0 that ensure the validity of the Boundary Point Principle. In this talk we present a new counterexample illustrating the sharpness of $C^{1, Dini}$ -assumption on $\partial\Omega$. In other words, we show (see [AN16] for details) that violating the Dini condition just in one direction causes the failure of the estimates of Hopf-Oleinik type.

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