

Sofia - Kovalevskaya - Lecture



Prof. Dr. Gerd Grubb
(University of Copenhagen)

September 28th 2019, 2:00 pm,

Room V2 210/216

Title:

Regularity of solutions to fractional-order boundary problems

Abstract:

Fractional powers of the Laplacian, $(-\Delta)^a$ with $0 < a < 1$, have been the focus of much research in recent years, because they have an important role as generators of Lévy processes of interest in financial theory, and enter also in mathematical physics and differential geometry. Various methods have been used, mostly from probability and potential theory. Our special interest is pseudodifferential methods (which combine the integral operator point of view with the Fourier transform).

We consider this and other related operators of order $2a$, restricted to act on a bounded smooth subset Ω of R^n . Here one can define a homogeneous Dirichlet problem, whose precise domain has been a subject of research. We shall explain a fairly elementary characterization of the domain (corresponding to data in Sobolev or Hölder spaces), which has been worked out recently.

Next, this is used in a study of the regularity of solutions to time-dependent ("heat") problems, and resolvent problems, associated with the operator. It is found that, contrary to problems without a time-parameter or a spectral parameter, the boundary regularity of solutions does not increase to infinity when the regularity of the data grows to infinity --- unless extra boundary conditions are imposed.

Jury

Barbara Baumeister (Bielefeld University)

Bettina Eick (TU Braunschweig)

Barbara Gentz (Bielefeld University)