



FMSP Lectures

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Selected topics in fractional partial differential
equations

December 16 (Wed) 10:30 ~ 12:00 Room 128

Abstract:

In this talk, some remarkable mathematical and physical properties of solutions to the fractional diffusion equation, the alpha-fractional diffusion and alpha-fractional wave equations, the fractional reaction-diffusion equation, and the fractional Schrödinger equation are revisited. From the mathematical viewpoint, the maximum principle for the initial-boundary-value problems for the fractional diffusion equation, the scaling properties of the solutions to the alpha-fractional diffusion and alpha-fractional wave equations and the role of the Mellin integral transform technique for their analytical treatment, as well as the eigenvalue problem for the fractional Schrödinger equation are considered. Physical aspects include a discussion of a probabilistic interpretation of the fundamental solutions to the Cauchy problem for the alpha-fractional diffusion equation, their entropy and the entropy production rates, and some different concepts of the propagation velocities of the fractional wave processes.