Recovering the historical distribution for nonlinear space-fractional diffusion equation with temporally dependent thermal conductivity in higher dimensional space

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Abstract of the talk

In this talk, we investigate the problem of recovering the historical distribution for a nonlinear space-fractional diffusion equation with temporally dependent thermal conductivity in higher dimensional space. This problem is obtained from the classical diffusion equation by replacing the second-order space derivative with a fractional laplacian of order $\alpha \in (1/2, 1]$, which is usually used to model the anomalous diffusion. The problem is severely ill-posed. To regularize the problem, we propose a modified version of the Tikhonov regularization method. A stability estimate of Hölder type is established. Finally, several numerical examples based on the finite difference approximation and the discrete Fourier transform are presented to illustrate the theoretical results.

(*) This work is based on a joint work with Hoang-Hung Vo.

References

[1] Tran Thi Khieu, Hoang-Hung Vo, *Recovering the historical distribution for nonlinear space-fractional diffusion equation with temporally dependent thermal conductivity in higher dimensional space*, Journal of Computational and Applied Mathematics, Volume 345, 1 January 2019, Pages 114-126.