ON EIGENVALUE PROBLEMS ARISING FROM NONLOCAL DIFFUSION MODELS

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Abstract

In this talk, we aim at saying as much as possible about the spectra of three classes of linear diffusion operators involving nonlocal terms. In all but one cases, we characterize the minimum λ_p of the real part of the spectrum in two max-min fashions, and prove that in most cases λ_p is an eigenvalue with a corresponding positive eigenfunction, and is algebraically simple and isolated; we also prove that the maximum principle holds if and only if $\lambda_p > 0$ (in most cases) or ≥ 0 (in one case). We prove these results by an elementary method based on the strong maximum principle, rather than resorting to Krein-Rutman theory as did in the previous papers. In one case when it is impossible to characterize λ_p in the max-min fashion, we supply a complete description of the whole spectrum. This is the joint work with Jerome Coville and Xuefeng Wang.