

New Kind of Observations in an Inverse Parabolic Problem

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Abstract

In this talk, I analyze the inverse problem of determining the reaction term $f(x, u)$ in reaction-diffusion equations of the form $\partial_t u - D\partial_{xx}u = f(x, u)$, where f is assumed to be periodic with respect to $x \in \mathbb{R}$. Starting from a family of exponentially decaying initial conditions $u_{0,\lambda}$, I will show that the solutions u_λ of this equation propagate with constant asymptotic spreading speeds w_λ . The main result shows that the linearization of f around the steady state 0, $\partial_u f(x, 0)$, is uniquely determined (up to a symmetry) among a subset of piecewise linear functions, by the observation of the asymptotic spreading speeds w_λ .