



Contribution ID: 17

Type: **Contributed Talk**

Attractors for a class of Degenerate Parabolic Equations

Thursday, 26 February 2026 14:55 (20 minutes)

Degenerate parabolic equations arise in a variety of models in which diffusion vanishes or weakens in certain regions, thereby giving rise to substantial analytical difficulties. In particular, degeneracy strongly affects compactness and dissipative properties, which play a crucial role in the study of long-time dynamics and asymptotic behavior.

In this talk, we focus on a class of degenerate parabolic equations of Caldiroli–Musina type, characterized by the diffusion operator

$\operatorname{div}(\sigma(x)\nabla u)$, where σ is a non-negative measurable function that may vanish at finitely many points. More precisely, σ satisfies the structural conditions introduced by Caldiroli and Musina (2000). In recent years, the existence and asymptotic behavior of parabolic equations of the form

$$u_t - \operatorname{div}(\sigma(x)\nabla u) + f(u) + g(x) = 0, \tag{1}$$

have attracted considerable attention. Equation (1) can be viewed as a simplified model for neutron diffusion arising in feedback control of nuclear reactors, where u and σ denote the neutron flux and the neutron diffusion coefficient, respectively.

We investigate equation (1) under various assumptions on the nonlinear terms, considering both autonomous and non-autonomous settings, as well as bounded and unbounded domains in \mathbb{R}^N . The main aim of the talk is to illustrate how appropriate energy methods combined with suitable functional frameworks ensure the existence of global attractors and allow for a qualitative description of their structure. Finally, we provide an overview of related open problems and outline several directions for future research. This presentation is intended for a broad audience interested in partial differential equations and infinite-dimensional dynamical systems.

Affiliation

<https://scholar.google.com/citations?user=jScEXFoAAAAJ&hl=en>

Author: LE THI, Thuy (Electric Power University)

Presenter: LE THI, Thuy (Electric Power University)

Session Classification: PDEs