

An introduction to reaction diffusion systems
(from a mathematical perspective)

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Reaction diffusion equations (RD) are nonlinear partial differential equations that are ubiquitous in modelling many phenomena. For instance, we see them in ecology models to study population dynamics, in thermodynamics, in chemical reactions, and much more. Roughly speaking, the unknown in these nonlinear problems is a density function, which is time and space dependent. I will derive a general RD equation and address few problems that have been answered by mathematical analysts and would not have been answered so accurately by the sole use of experiments. In particular, we will shed light on the notion of incompressibility and its contribution to measure preserving in flow dynamics.

Time permitting, I will speak about the influence of a large drift on the evolution of the unknown density function and the connection between RD equations and spectral analysis. This talk is intended to be accessible to audience with various academic backgrounds.

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