

Reaction-diffusion problems with membrane conditions

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Several problems, issued from physics, biology or the medical science, lead to parabolic equations set in two sub-domains separated by a membrane with selective permeability to specific molecules. The corresponding boundary conditions, describing the flow through the membrane, are compatible with mass conservation and energy dissipation, and are called the Kedem-Katchalsky conditions.

A huge literature deeply analyses usual reaction-diffusion systems and we extended to membrane problems an existence theory compatible with the L^1 bounds ([3, 4]). In particular, in [2] we were interested in developing a theory of weak solutions when the initial data has only L^1 regularity and the reaction terms are, for instance, quadratic. A classical numerical study on reaction-diffusion systems concerns Turing instability. In [1], we illustrate patterns formation and their discontinuous behaviour passing through the membrane.

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- [4] M. Pierre. *Global existence in reaction-diffusion systems with control of mass : a survey*. Milan Journal of Mathematics, **78(2)**, 417–455, 2010.