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Reaction-diffusion equations and transition waves

The first part of the talk is concerned with various generalizations of the usual notions of waves, fronts and propagation mean speed in a heterogeneous environment. The new notions involve uniform limits, with respect to the geodesic distance, to a family of hypersurfaces which are parametrized by time. Transition waves not only extend the standard notions to a very general setting, but, under some appropriate assumptions in classical cases, they reduce to them. General intrinsic properties, monotonicity properties and uniqueness results for almost-planar fronts have been obtained with H. Berestycki.

New geometric situations can also be covered by the new notions. As an example, we will see in a second part (with H. Berestycki and H. Matano) how to describe the propagation of a generalized almost-planar front around an obstacle for bistable reaction-diffusion equations.