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Propagation dynamics for time-periodic and partially degenerate reaction-diffusion systems

This talk is concerned with the propagation dynamics for partially degenerate diffusion systems with monostable and time-periodic nonlinearity. In the cooperative case, we prove the existence of periodic traveling fronts and the exponential stability of continuous periodic traveling fronts. In the non-cooperative case, we establish the existence of the minimal wave speed of periodic traveling waves and its coincidence with the spreading speed. More specifically, when the system is non-degenerate, the existence of periodic traveling waves is proved by using Schauder's fixed point theorem and the regularity of analytic semigroup; while in the partially degenerate case, due to the lack of compactness and standard parabolic estimates, the existence result is obtained by appealing to the asymptotic fixed point theorem with the help of some properties of the Kuratowski measure of noncompactness. It may be the first work to study the periodic traveling waves of partially degenerate reaction-diffusion systems with non-cooperative and time-periodic nonlinearity.