# PATTERNS IN PARABOLIC PROBLEMS WITH NONLINEAR BOUNDARY CONDITIONS

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We obtain existence of asymptotically stable non-constant equilibrium solutions for semilinear parabolic equations with nonlinear boundary conditions on small domains connected by thin channels. We prove the convergence of eigenvalues and eigenfunctions of the Laplace operator in such domains. This information is used to show that the asymptotic dynamics of the heat equation in this domain is equivalent to the asymptotic dynamics of a system of two ordinary differential equations diffusively (weakly) coupled. The main tools employed are the invariant manifold theory and a uniform trace theorem.

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