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Section:

9. Ordinary Differential Equations and Dynamical Systems

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A geometrical description for the attractors of semilinear parabolic PDE

We investigate the global attractor of the equation $u_t = u_{xx} + f(u, u_x, x)$ on a interval with Neumann boundary conditions and dissipative f. The attractor consists of equilibria and their unstable manifolds. We show how the nodal properties of the equilibria can be used to determine heteroclinic orbits in the attractor. The combinatorial properties of the equilibria are described by meandric permutations. Especially the correspondence between nodal properties and exponential rates in the attractor is pointed out.