

Dissipative periodic and chaotic patterns to the KdV–Burgers and Gardner equations

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Abstract

We investigate the KdV-Burgers and Gardner equations with dissipation and external perturbation terms by the approach of dynamical systems. The stability of the equilibrium point is considered, and Hopf bifurcations are investigated after a certain scaling that reduces the parameter space of a three-mode dynamical system which now depends only on two parameters. In the case of the KdV-Burgers, we find homoclinic chaos by using Shil'nikov's theorem.