Finite mode analysis of the generalized Kuramoto-Sivashinsky equation

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Abstract

We present numerical results concerning a five mode truncation of the equation $u_t + uu_x + \delta u_{xxx} + u_{xx} + u_{xxxx} = 0$ subject to periodic boundary conditions. We find that for large δ the system evolves from most initial conditions into a final state consisting of one or two traveling pulses, depending on the initial condition and horizontal periodicity. This is due to a region of simultaneous stability of the first two branches that bifurcate from the trivial solution. An additional two pulse traveling wave which does not bifurcate from $u = 0$ is also present.