Wave-splitting in the bistable Gray-Scott model

The Gray-Scott model describes a chemical reaction in which an activator species grows autocatalytically on a continuously fed substrate. For certain feed rates and activator life times the model shows the coexistence of two homogeneous steady states. The blue state, where the activator concentration is relatively high and limited by substrate depletion, may again undergo a Hopf bifurcation and a subcritical Turing bifurcation capable of producing global as well as localized, stationary spatial structures. The paper presents the results of a computer simulation study of these far-from-equilibrium phenomena. Special emphasis is given to the propagation, collision and splitting of traveling pulses.