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Traveling wavefronts to a model of precursor and differentiated cells

This talk presents a comprehensive analysis of the rich and complex propagation dynamics to a model of precursor and differentiated cells, with the appearance of non-isolated equilibria on a line in the phase space. We established the existence of traveling waves in the monostable monotone case by means of continuation argument via perturbation in a weighted functional space, by applying the abstract implicit function theorem. We provided necessary and sufficient conditions of the minimal wave speed selection and proved the existence of the transition (turning point) k^* for the minimal wave speed when the parameters λ and γ are fixed. Two explicit estimates about k^* were given. We investigated the decay rate of the minimal traveling wave as $z \to \infty$ in terms of the value of k. We further proved the existence of non-negative wavefronts in the monostable non-monotone case and found that the minimal wave speed is always linearly selected. Finally, in the bistable monotone case, the existence and uniqueness of bistable traveling waves were proved via constructing an auxiliary parabolic non-local equation.