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Dynamical analysis in a nonlocal delayed reaction–diffusion tumor model with therapy

In this talk, we study a nonlocal delayed reaction-diffusion model for tumor growth under therapy. The model includes nonlinear tumor-therapy interactions, spatial diffusion, and a nonlocal delayed response. Using the Lyapunov-Schmidt reduction, we establish the existence of a nontrivial steady-state solution bifurcating from the trivial solution and obtain an approximate expression for a spatially inhomogeneous steady state. We then analyze the spectrum of the linearized operator, derive explicit stability criteria, and identify delay-induced Hopf bifurcation regimes. Numerical simulations are presented to support the theoretical results and to illustrate how treatment parameters affect stability and oscillatory behavior.