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Numerical study of mass structured models with boundary delay

We study equilibrium and oscillatory solutions of a general mass structured system with a boundary delay. Such delays may be derived from systems with a separate egg class. Analytical calculations reveal existence criteria for non-trivial steady states and Hopf bifurcation. We further explore parameter space using numerical calculations. This analysis is then applied to a mass structured slug population model revealing that whilst oscillations and irregular dynamics can be observed for total biomass, compactly supported distinct cohorts in the manner suggested by experimental data do not emerge. Leapfrogging cohorts, however, do result and may be enhanced by selective predation.

This is a joint work with J.C. López-Marcos from Departmento of Matemática Aplicada, Universidad de Valladolid, and Martin A. Bees from Department of Mathematics, University of Glasgow.