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Stability of non-monotone traveling waves for Nicholson's blowflies equations

In this talk, we consider Nicholson's blowflies equations. When the ratio of birth rate and death rate satisfies $p/d > e$, the equation losses its monotonicity, and the traveling waves are non-monotone and oscillating when the delay time r is big. The stability of such kind waves have been open and challenging as we know. In this talk, we prove that, when $e < \frac{p}{d} < e^2$, for any delay time $r > 0$, the traveling waves $\phi(x + ct)$ with $c > c_* > 0$ ($c_* > 0$ is the minimum wave speed) are asymptotically stable, when the initial perturbation is small enough; while, when $p/d \geq e^2$, we prove that these oscillating traveling waves are stable only for a small delay time $r \ll 1$, and unstable for $r \gg 1$. All these theoretical results are also confirmed numerically by some computing simulations.

This is a joint work with C.-K. Lin, C.-T. Lin and Y.-P. Lin.