

Applied Dynamical Systems Seminar

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HH-3017 from 2:00-3:00 p.m.

Threshold dynamics of a time-delayed SEIRS model with pulse vaccination

Abstract:

We consider a delayed SEIRS model with pulse vaccination and varying total population size. The basic reproduction number R_0 is derived, and it is shown that the disease-free periodic solution is globally attractive if $R_0 < 1$, while the disease is uniformly persistent if $R_0 > 1$.

Our results improve the results by Gao et al. (2007), where they left the open problem of finding a sharp threshold which determines the eradication and uniform persistence. Numerical simulations are conducted to illustrate the analytical results and explore the influences of pulse vaccination and time delay on the spread of the disease. To the best of our knowledge, it is the first work to have the sharp threshold dynamics for impulsive epidemic models with the delay in the infected compartments.