Applied Dynamical Systems Seminar

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3:30-4:30pm, HH-3017

A Periodic Vector-Bias Malaria Model with Incubation Period

Abstract:

In this project, we propose a malaria model which takes into account the climate factors, the extrinsic incubation period (EIP) and the vector-bias effect. We first obtain the basic reproduction ratio R0 and then prove that it serves as a threshold parameter in determining the global dynamics of the model, that is, the disease-free periodic solution is globally attractive if R0 is less than one, and the system admits a unique positive periodic solution which is globally attractive if R0 is greater than one. Numerically, we study the malaria transmission case in Maputo Province, Mozambique. Our numerical simulations are consistent with the obtained analytic results. In addition, we observe that the ignorance of vector-bias effect may overestimate the number of the infectious humans and prolonging the length of the EIP is helpful for the control of the disease.