Backward Bifurcation Analysis for A Malaria Transmission Model

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In the epidemiology of infectious diseases, the backward bifurcation phenomenon refers to the situation where the disease-free equilibrium coexists with an endemic equilibrium when the basic reproduction number is less than unity, both equilibrium points being locally asymptotically stable. This work is based on the paper Chitnis et al. 2006 (Bifurcation Analysis of a mathematical model for malaria transmission) in which a conjecture is made regarding on the existence of the backward bifurcation for a malaria transmission model proposed the method. By using the Center Manifold Theory, we establish sufficient conditions for the occurrence of the backward bifurcation.