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EFFECTS OF ANTI-INFECTION BEHAVIOR ON THE EQUILIBRIUM STATES OF AN INFECTIOUS DISEASE

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Abstract. We propose a mathematical model to analyze the effects of anti-infection behavior on the equilibrium states of an infectious disease. The anti-infection behavior is incorporated into a classical epidemiological SIR model, by considering the behavior adoption rate across the population as an additional variable. We consider also the effects on the adoption rate produced by the disease evolution, using a dynamic payoff function and an additional differential equation. The equilibrium states of the proposed model have remarkable characteristics: possible coexistence of two locally stable endemic equilibria, the coexistence of locally stable endemic and disease-free equilibria, and even the possibility of a stable continuum of endemic equilibrium points. We show how some of the results obtained may be used to support strategic planning leading to effective control of the disease in the long-term.