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*On the Dynamics of a Diffusive Foot-and-Mouth Disease Model with Nonlocal Infections*

Foot-and-mouth disease (FMD) is an acute and highly contagious infectious disease of cloven-hoofed animals. In order to reveal the transmission dynamics and explore effective control measures of FMD, we formulate a diffusive FMD model with a fixed latent period and nonlocal infections. The threshold dynamics of the FMD model is determined by using the basic reproduction number $\mathcal{R}_0$: if $\mathcal{R}_0 < 1$ then the disease-free equilibrium $E_0$ is globally asymptotically stable; otherwise $E_0$ is unstable and there exists an endemic equilibrium $E^*$. Numerical simulations confirm the theoretical results and suggest that reducing the direct contact rate $\beta_1$ and the indirect contact rate $\beta_2$ is important in relieving FMD outbreaks. By carrying out some sensitivity analysis of $\mathcal{R}_0(> 1)$ and the equilibrium value of the infectious individuals $I^*$ in terms of $\beta_1$ and $\beta_2$, it is found that the $(\beta_1, \beta_2)$-plane is divided into two regions by the intersection of two parameter-related surfaces, the sensitivity of $\mathcal{R}_0$ and $I^*$ varies when $\beta_1$ and $\beta_2$ belong to different regions. When the values of both $\beta_1$ and $\beta_2$ are very large or very small, $\beta_1$ plays a more significant role on the transmission of FMD. These results indicate that stamping out the infected individuals and blocking the epidemic spots and areas are effective in preventing and controlling the spread of FMD.