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Analysis of Stability in Monkeypox Transmission Dynamics

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Abstract

This study presents a mathematical analysis of a dynamic model describing the transmission of monkeypox in a human population. The model is formulated as a system of nonlinear ordinary differential equations based on a compartmental framework. The positivity and boundedness of solutions are established to ensure the biological relevance of the model.The existence of the disease-free and endemic equilibria is investigated, and their stability properties are analyzed. Local stability is examined using Jacobian matrix techniques, while global stability is established through appropriate Lyapunov functions and LaSalle's invariance principle.
These results provide a clear qualitative understanding of the long-term behavior of the system and contribute to the development of effective strategies for controlling the spread of monkeypox.

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