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Stability Analysis and Numerical Investigation of a Bioeconomic Model for African Swine Fever

Communication Info

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Abstract

This study analyzes a bioeconomic epidemiological model describing the transmission dynamics of African Swine Fever (ASF) in a pig population coupled with economic capital evolution (Kouidere et al., 2021; Kröger & Schlickeiser, 2020). The model is formulated as a system of nonlinear differential equations incorporating host–vector interactions and the economic impact of disease spread . The basic reproduction number is derived and used as a threshold parameter for determining disease extinction or persistence. The existence and local stability of equilibrium points are established using linearization methods, and conditions for global stability are obtained under suitable assumptions. Numerical simulations are performed to support the analytical results and to illustrate the influence of key epidemiological and economic parameters on system dynamics. The findings provide insight into the relationship between disease progression and economic outcomes, and contribute to the mathematical understanding of bioeconomic epidemic

References

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