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A QUASI-STEADY-STATE APPROXIMATION TO THE BASIC TARGET-CELL-LIMITED VIRAL DYNAMICS MODEL WITH A NON-CYTOPATHIC EFFECT

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Analysis of previously published target-cell limited viral dynamic models for pathogens such as HIV, hepatitis, and influenza generally rely on standard techniques from dynamical systems theory or numerical simulation. We use a quasi-steady-state approximation to derive an analytic solution for the model with a non-cytopathic effect, that is, when the death rates of uninfected and infected cells are equal. The analytic solution provides time evolution values for all three compartments of uninfected cells, infected cells, and virus. Results are compared with numerical simulation using clinical data for equine infectious anemia virus (EIAV), a retrovirus closely related to HIV, and the utility of the analytic solution is discussed.

Biography

Richard Cangelosi has earned a PhD in Mathematics from Washington State University in 2014. His research interests include Modelling Nonlinear Phenomena with Application to Biology and Ecology, Models for Biological Pattern Formation, Delay Equations, Perturbation Theory, Chaos Theory and the Fractal Geometry of Strange Attractors. He is currently a Faculty Member at Gonzaga University.

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