

JOHANNES GUTENBERG-UNIVERSITÄT MAINZ - 55099 Mainz

Einladung zum Vortrag  
im Oberseminar Analysis

***Global analysis of a spatiotemporal cellular model  
for the transmission of hepatitis C virus with  
Hattaf-Yousfi functional response***

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This paper carries out a mathematical analysis of the global dynamics of a partial differential equation viral infection cellular model. We study the dynamics of a hepatitis C virus (HCV) model, under therapy, that considers both absorption phenomenon and diffusion of virions, infected and uninfected cells in the liver. Firstly, we prove the boundedness of the potential solutions, global existence, uniqueness, and positivity of the solution to the obtained initial value and boundary problem. Then, the dynamical behaviour of the model is entirely determined by a threshold parameter called the basic reproduction number denoted  $\mathcal{R}_0$

We show that the uninfected spatially homogeneous equilibrium of the model is globally asymptotically stable if  $\mathcal{R}_0 \leq 1$  by using the direct Lyapunov method. The latter means that the HCV infection is cleared, and the disease dies out.

Also, the global asymptotical properties stability of the infected spatially homogeneous equilibrium of the model are studied via a skilful construction of a suitable Lyapunov functional. It means that the HCV infection persists in the host, and the infection becomes chronic. Finally, numerical simulations are performed to support the theoretical results obtained.

FACHBEREICH 08

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Alle Interessierten sind herzlich eingeladen!

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