

A Nonlocal PDE Biosensor Model

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ABSTRACT

In this talk we consider a biosensor model in R^3 , consisting of a coupled parabolic differential equation with Robin boundary condition and an ordinary differential equation. Theoretical analysis is done to show the existence and uniqueness of a Holder continuous solution based on a maximum principle, weak solution arguments. The long-time convergence (exponentially) to a steady state is also discussed as well as the system situation. Next, a finite volume method is applied to the model to obtain an approximate solution. Drawing in part on the analytical results given earlier, we establish the existence, stability and error estimates for the approximate solution, and derive L_2 spatial norm convergence properties. Finally, some illustrative numerical simulation results are presented.