PHYSICAL MATHEMATICS SEMINAR

A THREE-DIMENSIONAL MODEL OF CELLULAR ELECTRICAL ACTIVITY

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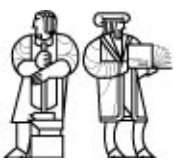
ABSTRACT:

We present a three-dimensional model of cellular electrical activity. This model takes into account the three-dimensional geometry of biological tissue as well as ionic concentration dynamics, both of which are neglected in conventional models of electrophysiology. We use asymptotic and mathematical analysis to study the properties of this model. This analysis reveals in particular the presence of multiple spatio-temporal scales. A time-implicit numerical method is developed to tackle this difficulty. This methodology is applied to cardiac physiology. We use simulations to explore the characteristics of a recently observed anomalous mode of cardiac action potential propagation: cardiac propagation without gap junctions.

TUESDAY, FEBRUARY 12, 2008
2:30 PM
Building 4, Room 370

Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)



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