Meeting: 1006, Lubbock, Texas, SS 9A, Special Session on Theory and Application of Stochastic Differential Equations

1006-92-84 **Mahbubur Rahman*** (mrahman@ucdavis.edu), 1220 Cornell Drive, Davis, CA 95616. *Noise sustained wave propagation and its application to mathematical neurosciences.*

This presentation investigates the approximation of certain problems arising in the mathematical neurosciences where noise is present. In particular, we provide a detailed derivation of recent central limit theorems along with a new theorem of stochastic integrals used in the numerical approximation of the solution. We investigate the noise-induced wavepropagation through a chain of saddle node bifurcation on limit cycle using the Voltage Control Oscillator Neuron Model described as $\dot{\theta}$-neural network. Asymptotic convergence results for $\dot{\theta}$- neural network is verified numerically. A continuous analog of a discrete Voltage Controlled Oscillator Neuron model ($\dot{\theta}$-neural network) of transmission line in neural networks is introduced. We proposes a new approach to the numerical solution of a Fredholm integro–differential equations modelling neural networks. A solution strategy is based on the use of Gaussian quadrature rules for the infinite interval of integration and interpolation to a uniformly distributed grid on bounded subinterval. The effectiveness of the approach is illustrated by numerical experiments. (Received February 07, 2005)