Meiji University Global COE Program
26th Mathematical Sciences based on Modeling, Analysis and Simulation seminar

Date： June 24, 2010, 16:30～18:00
Location： Meiji Univ. Ikuta Campus, Build 2 Annex A, Room A207

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Title :Mathematical models in biosignals

Abstract :The aim of mathematical modeling is to understand the mechanisms that govern the working of complex systems and to detect anomalous signals by using model coefficients or theoretical indices. For instance, detection is effective for diagnosing diseases. Anomalous signals can be generated by the degeneration of the potential function in the dynamical equation systems (DESs) or by fundamental changes in the DESs themselves, for instance, an increase in the degrees of freedom or the addition of stochastic factors. Visible determinism in the latter case would be different from that in the case without random variables. DESs were obtained as mathematical models that regenerated time series data such as those obtained from electrocardiography, electrogastrography, body sway, etc. It is especially well known that the mathematical models of some biosignals can be developed by using stochastic processes. A correspondence has been obtained between the distributions of time series and temporally averaged potential functions in stochastic differential equations. By performing time series analysis of the biosignals, the authors have succeeded in identifying the nonlinearity in a potential function that has several minima. Fluctuations could be observed in the neighborhood of the minima. We discuss the metamorphism in the potential function due to the application of a specific artificial load.

Everyone is welcome to attend the MAS seminar.

Access: 10 minutes on foot from Ikuta St. Odakyu line,
Or 10 minutes by bus No. 13「明治大学正門前」, get off at the last stop.
See http://www.meiji.ac.jp/koho/campus_guide/ for details.