



Meiji University Global COE Program

56th Mathematical Sciences based on



Modeling, Analysis and Simulation seminar

Date: October 4, 2012, 16:30~18:00

Location: Meiji Univ. Ikuta Campus, Build 2 Annex A, Room A206.

Tai-Chia Lin (National Taiwan Univ.)

Title : A new model of ion channels: PNP-steric equations

Abstract: A class of approximate Lennard-Jones (LJ) potentials with a small parameter is found whose Fourier transforms have a simple asymptotic behavior as the parameter goes to zero. When the LJ potential is replaced by the approximate LJ potential, the total energy functional becomes simple and exactly the same as replacing the LJ potential by a delta function. Such a simple energy functional can be used to derive the Poisson-Nernst-Planck equations with steric effects, called PNP-steric equations being a new mathematical model for the LJ interaction in ionic solutions. Stability and instability conditions for the 1D PNP-delta equations with the Dirichlet boundary conditions for one anionic and cationic species are expressed by the valences, diffusion constants, ionic diameters and coupling constants. This is the first step to study the dynamics of solutions of the PNP-steric equations.

Everyone is welcome to attend the MAS seminar.

Meiji institute for Advanced Study of Mathematical Science (<http://www.mims.meiji.ac.jp>)
(Organizers: M. Mimura, D. Ueyama, Y. Wakano, K. Ikeda and S. Kinoshita)

MAS seminar is partly supported by Meiji University Global COE program "Formation and Development of Mathematical Sciences Based on Modeling and Analysis" (<http://goe.mims.meiji.ac.jp/>), the Grant-in-Aid for Scientific Research (S), "Mathematical Theory of Nonlinear-Non-equilibrium Reaction-Diffusion Systems" by M. Mimura (<http://nnrds.math.meiji.ac.jp/>).



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.