Fritz-Haber-Institut der Max-Planck-Gesellschaft, Humboldt-Universität zu Berlin, Max-Delbrück-Centrum für Molekulare Medizin, Otto-von-Guericke-Universität Magdeburg, Physikalisch-Technische Bundesanstalt, Technische Universität Berlin, Universität Potsdam

Berlin Center for Studies of Complex Chemical Systems

Seminar

Complex Nonlinear Processes in Chemistry and Biology

Honorary Chairman: G. Ertl
Organizers: M. Bär, C. Beta, H. Engel, M. Falcke, M. J. B. Hauser, J. Kurths, A. S. Mikhailov, P. Plath, L. Schimansky-Geier, and H. Stark

Wednesday, June 14, 2017, at 16:00 c.t.
Address: Technische Universität Berlin, Hardenbergstraße 36, 10623 Berlin, Eugene-Paul-Wigner-Gebäude EW 731

Rodrigo Weber dos Santos

Federal University of Juiz de Fora, Brazil

A flexible optimization-based algorithm for the construction of biological networks: from arterial trees to cardiac Purkinje networks

I will discuss the multi-use of the method called CCO (Constructive Constrained Optimization). This method was first proposed for the construction of geometrical models of arterial trees. We describe how the same framework was used and extended for the construction of models of the Purkinje network (PN) of the heart. The method iteratively constructs the PN by minimizing an objective function, for instance, the total length of the generated PN tree. In addition, it can take into account some important topological information of the network, such as the location of the Purkinje-muscle junctions (PMJs) and the average bifurcation angle found in the literature. The generated models of the PNs were compared to the classical L-System method and to a recently proposed image-based technique.