数学与系统科学研究院

计算数学所学术报告

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报告题目：

Spatiotemporal integration of synaptic inputs in neurons: computational modeling, analysis and experiments

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报告时间：2016 年 8 月 5 日（周五）

下午 14:00~15:00

报告地点：　　科技综合楼三层

311 报告厅

Abstract:

A neuron receives thousands of synaptic inputs from other neurons and integrates them to process information. Many experimental results demonstrate this integration could be highly nonlinear, yet few theoretical analyses have been performed to obtain a precise quantitative characterization. Based on asymptotic analysis of an idealized cable model, we derive a bilinear spatiotemporal integration rule for a pair of time-dependent synaptic inputs. Note that the above rule is obtained from idealized models. However, we have confirmed this rule both in simulations of a realistic pyramidal neuron model and in electrophysiological experiments of rat hippocampal CA1 neurons. Our results demonstrate that the integration of multiple synaptic inputs can be decomposed into the sum of all possible pairwise integration with each paired integration obeying a bilinear rule.

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