

abstract

COMPUTER SCIENCE AND DISCRETE MATHEMATICS SEMINAR II

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

Boolean Threshold Functions (BTF) arise in many contexts, ranging from computer science and learning theory to theoretical neurobiology. In this talk, I will present non-rigorous approaches developed in the statistical physics of disordered systems to characterize BTF in a quantitative way [1], with an emphasis on computational and geometrical aspects. These techniques will be illustrated on two particular cases: the celebrated perceptron (Linear Threshold Function) [2], and the more realistic tempotron model of a neuron [3,4].

References:

[1] Statistical mechanics of learning. Engel, A. and Broeck, C., Cambridge University Press (2001)

[2] Optimal storage properties of neural network models. Gardner, E. and Derrida, B., J. Phys. A: Math. Gen 21, 271 (1988)

[3] The tempotron: a neuron that learns spike timing--based decisions. Gutig, R. and Sompolinsky, H., Nature Neuroscience 9, 420 (2006)

[4] Theory of spike timing-based neural classifiers.
Rubin R., Monasson, R. and Sompolinsky, H., Phys. Rev. Lett. 105, 218102 (2010)