KOÇ UNIVERSITY

Science – Math Seminar

Speaker: Alkan Kabakçıoğlu
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Date: Thursday, Mar. 10, 2005
Time: 16:45 (Tea and cookies will be served at 16:30)
Place: Science Building, Room Z42

Title: Origin of the connectivity distribution in gene regulation networks

Abstract:
Development of the DNA microarray technique in the late 1990s allowed the large-scale analysis of gene regulation by delivering a direct, accurate, and simultaneous measure of the expression levels for thousands of genes, in some cases, such as the budding yeast Sacchaomyces cerevisiae, the whole genome. A gene regulation network (GRN) comprising pairs of genes that are co-expressed and/or regulate each other's expression can be harvested from such data. GRN appears to have a peculiar connectivity distribution that has been suggested to stem from dynamic or evolutionary principles. We show here that an information theoretic model reproduces two seemingly unrelated features of expression regulation: 1. Number of genes regulated by a given gene (connectivity distribution), 2. Lengths of regulating segments (RS) along the DNA. In addition to providing an analytical connection between these two components of gene regulation, our results imply that the connectivity statistics is a direct consequence of the variable (although not random) composition of the RSs and that signatures of further organizational principles which shaped the network are to be found in subtler aspects.

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