Seminar on Combinatorial Computing
December 8, Wednesday, 6:30 p.m.
Room 6421, Graduate Center
365 Fifth Avenue, New York

The Majority Action on Infinite Graphs: Strings and Puppets

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Abstract

We consider the following dynamic process on the $0-1$ colourings of the vertices of a graph. The initial state is an arbitrary colouring, and the state at time $t+1$ is determined by assigning to each vertex the colour of the majority of its neighbours at time t (in case of a tie, the vertex retains its own colour at time t). It is known that if the graph is finite then the process either reaches a fixed colouring or becomes periodic with period two. Here we show that an infinite (locally finite) graph displays the same behaviour locally, provided that the graph satisfies a certain conditio n which, roughly speaking, imposes an upper bound on the growth rate of the graph. Among the graphs obeying this condition are some that are most common in applications, such as the grid graph in two or more dimensions. We also extend the analysis to more general dynamic processes, and compare our results to the seminal work of Moran in this area. (Joint work with Yuval Ginosar.)

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or visit our website: http://math.gc.cuny.edu/Seminars/Combinatorics.html