Seminar on Combinatorial Computing
November 17, Wednesday, 6:30 p.m.
Room 6417, Graduate Center
365 Fifth Avenue, New York

Online Conflict-Free Colorings

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Abstract

Motivated by frequency assignment problems in cellular networks, some new coloring problems of the following flavor were recently introduced:

What is the minimum number $f(n)$ such that one can assign colors to any set P of n points in the plane, using a total of at most $f(n)$ colors and such that this coloring have the following property (which we refer to as Conflict Free coloring): For any disc d in the plane, with nonempty intersection with P, there is at least one point of P inside d which has a unique color among the points inside d. It was recently shown that $f(n) = O(\log n)$. (As a nice warmup exercise you can think on the restricted case where all points are on a line and replace discs with intervals). This is asymptotically tight in the worst case.

In this talk, we consider an online version of the conflict-free coloring of a set of points on the line, where each newly inserted point must be assigned a color upon insertion, and at all times the coloring has to be conflict-free, in the sense that in every interval I there is a color that appears exactly once in I.

Joint work with Amos Fiat, Meital Levy, Jiri Matousek, Elchanan Mossel, Janos Pach, Micha Sharir, Uli Wagner, Emo Welzl.

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http://www.math.nyu.edu/~pach/public_html/combinatorics_seminar.html