Seminar on Combinatorial Computing
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Room 6417, Graduate Center
365 Fifth Avenue, New York

Conflict-free coloring of geometric hypergraphs

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Abstract

A conflict-free coloring (CF-coloring) of hypergraph $H = (V, E)$ is a coloring of V such that for any hyperedge $e \in E$ there exists a vertex $v \in e$ with a unique color in e (i.e., no other vertex of e has the same color as v). We provide a framework for online (CF-coloring) any hypergraph. We use this framework to obtain an efficient randomized online algorithm for CF-coloring any k-degenerate hypergraph. As an application, we obtain order-optimal (i.e., using logarithmic colors) randomized online algorithms for some hypergraphs that arise in geometry and model an important version of the frequency assignment task for cellular networks. Our algorithms use fewer random bits and fewer colors than other algorithms in the literature.

We initiate the study of deterministic online CF-coloring with recoloring. The goal is to use few colors, but also resort to recoloring as little as possible. We provide algorithms using $O(\log n)$ colors and doing $O(n)$ recolorings.

Joint work with Amotz Bar-Noy, Svetlana Olonetsky, and Shakhar Smorodinsky.

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or visit our website
http://www.math.nyu.edu/p̃ach/public_html/combinatorics_seminar.html