Seminar on Combinatorial Computing
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Room 6495, Graduate Center
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The chromatic number of 3-space

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Abstract

The unit distance graph G_d of the Euclidean space $\Re^d$ is a graph whose vertices correspond to the points of $\Re^d$ and two vertices are connected if and only if the corresponding points have distance 1. The classical Hadwiger-Nelson problem (1944) asks for the chromatic number of the plane, or more precisely the chromatic number of the unit distance graph of the plane. The best known bounds are 4 and 7, due to Nelson and Isbell, respectively. In three dimensions, Raiskii (1970) proved that $\chi(G_3) \geq 5$ which was recently improved by Nechushtan (2000) to 6. The upper bound of 21 was independently established by Székely and Wormald (1989), and Bona and Tóth (1996).

We give a surprisingly easy proof that this chromatic number is at most 15. The talk will also cover some related open and solved problems. Joint work with Géza Tóth.

For further information contact Janos Pach at pach@cims.nyu.edu, or visit our website: http://www.math.nyu.edu/ pach/combinatorics_seminar.html