Conflict-free Colorings

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Motivated by a frequency assignment problem in cellular telephone networks, Even et al. studied the following question. Given a set P of n points in general position in the plane, what is the smallest number of colors in a coloring of the elements of P with the property that any closed disk D with $D \cap P \neq \emptyset$ has an element whose color is not assigned to any other element of $D \cap P$. We refer to such a coloring as a *conflict-free coloring* of P with respect to disks.

We can ask similar questions for general set systems: At least how many colors are needed to color the elements of the underlying set with the property that every member of the set system contains an element whose color is not repeated in the set? After surveying some basic results related to conflict-free colorings, we prove for instance that every system of m sets permits a conflict-free coloring with $O(\sqrt{m})$ colors. We apply our results to solve some related graph coloring questions. Joint work with Gábor Tardos.

For more information please visit the seminar website at:
http://www.math.nyu.edu/seminars/geometry_seminar.html.