Geometry Seminar
Tuesday, November 10, 2009
Room 202 WWH at 6:00 P.M.

Planar Graphs and Planar Posets

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In joint work with Stefan Felsner and C. M. Li, we proved the following theorems:

1. The dimension of the adjacency poset of a planar graph is at most 8. Lower bound of 5.

2. The dimension of the adjacency poset of an outerplanar graph is at most 5. Lower bound of 4.

3. The dimension of the adjacency poset of a height 2 poset with a planar graph is at most 4. This bound is tight.

Since D. Kelly constructed for each h at least 3, a poset P of height h and dimension $h+3$, the following theorem is natural and was proved with S. Felsner:

1. For each $h > 0$, there exists a constant c (depending on h) so that if P is a poset of height h and the cover graph of P is planar, then the dimension of P is at most c.

Our research has also resulted in the following special case and this will be joint work with J. Moore:

1. If P is a poset of height 2 with a planar cover graph, then P also has a planar Hasse diagram.

Note that the last result is best possible, since there exist posets of height 3 having planar cover graphs but not planar Hasse diagrams.

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