

VCU Discrete Mathematics Seminar

Local dimension of a poset

Dr Heather Smith
Georgia Institute of Technology

Wednesday, Mar. 21
1:00-1:50
4145 Harris Hall



The original notion of poset dimension is due to Dushnik and Miller (1941). Recently, Ueckerdt (2016) proposed a variant, called local dimension, which has garnered considerable interest. A local realizer of a poset P is a collection of partial linear extensions of P that cover the comparabilities and incomparabilities of P . The local dimension of P is least d for which there is a local realizer in which every element appears at most d times.

Hiraguchi (1955) proved that any poset with n points has dimension at most $n/2$, which is sharp. We prove that the local dimension of a poset with n points is $O(n/\log n)$. To show that this bound is best possible, we use probabilistic methods to prove the following stronger result which extends a theorem of Chung, Erdős, and Spencer (1983): There is an n -vertex bipartite graph in which each difference graph cover of the edges will cover one of the vertices $\Theta(n/\log n)$ times.

For the DM seminar schedule, see:

<http://www.people.vcu.edu/~dcranston/DM-seminar>