

1135-05-892

Jinha Kim, Ryan R. Martin, Tomáš Masařík, Warren Shull, Heather C. Smith*
(heather.smith@math.gatech.edu), **Andrew Uzzell** and **Zhiyu Wang**. *Local Dimension and Size of a Poset*. Preliminary report.

The original notion of poset dimension is due to Dushnik and Miller (1941). Very recently, Uerckerdt (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 the minimum frequency of a local realizer where frequency is the maximum multiplicity of an element of P .

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 also covers one of the vertices $\Omega(n/\log n)$ times. (Received September 22, 2017)