

1163-05-190

**Theo McKenzie\*** (mckenzie@math.berkeley.edu), **Peter Rasmussen** and **Nikhil**

**Srivastava.** *Support of Closed Walks and Second Eigenvalue Multiplicity of Regular Graphs.*

Spectral expansion can be used to bound the expected support of a walk of a given length in a graph. However, no such bound is known when conditioning on the walk being closed. We prove such a result by proving a new bound on the minimum entry of the eigenvector corresponding to the top eigenvalue of the adjacency matrix of a graph. We then use our result to improve the multiplicity of a given eigenvalue to  $n/\log^{O(1)}n$ . (Received August 25, 2020)