Local nodal surplus and nodal count distribution for graphs with disjoint loops.

Gregory Berkolaiko, Texas A&M University

Abstract: The nodal surplus of the n-th eigenfunction of a graph is defined as the number of its zeros minus $(n-1)$. When the graph is composed of two or more blocks separated by bridges, we propose a way to define a "local nodal surplus" of a given block. Since the eigenfunction index n has no local meaning, the local nodal surplus has to be defined in an indirect way via the nodal-magnetic theorem of Berkolaiko and Weyand.

We will discuss the properties of the local nodal surplus and their consequences. In particular, it also has a dynamical interpretation as the number of zeros created inside the block (as opposed to those who entered it from outside) and its symmetry properties allow us to prove the long-standing conjecture that the nodal surplus distribution for graphs with β disjoint loops is binomial with parameters $(\beta, 1/2)$.

The talk is based on a work in progress with Lior Alon and Ram Band.