

# Community detection in networks: eigenvector dynamics and subspace behavior under network perturbations

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**Abstract.** I will present an overview of the problem of community detection in networks, focussing especially on spectral community detection. Usually, most spectral methods to date use properties of eigenvalues for detecting communities. I will present some of our recent results on looking at how eigenvector dynamics can be used to *exactly* detect the number of modules or communities in a network, and detect them. I will discuss some novel properties of eigenvector dynamics under network perturbation (previously unreported in literature to the best of our knowledge) and how this reveals important information about modularity beyond traditional eigenvalue based analysis.