[Video] On the Approximation of Laplacian Eigenvalues in Graph Disaggregation

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Graph disaggregation is a technique used to address the high cost of computation for power law graphs on parallel processors. The few high-degree vertices are broken into multiple small-degree vertices, in order to allow for more efficient computation in parallel. In particular, we consider computations involving the graph Laplacian, which has significant applications, including diffusion mapping and graph partitioning, among others. We prove results regarding the spectral approximation of the Laplacian of the original graph by the Laplacian of the disaggregated graph. In addition, we construct an alternate disaggregation operator whose eigenvalues interface those of the original Laplacian. Using this alternate operator, we construct a uniform preconditioner for the original graph Laplacian.

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