



Hamilton Institute

Fixing Two Weaknesses of the Spectral Method for Graph Partitioning

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Yahoo! Research

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Abstract

We discuss two intrinsic weaknesses of the spectral graph partitioning method, both of which have practical consequences. The first is that spectral embeddings tend to hide the best cuts from the commonly used hyperplane rounding method. Rather than cleaning up the resulting suboptimal cuts with local search, we recommend the adoption of flow-based rounding.

The second weakness is that for many "power law" graphs, the spectral method produces cuts that are highly unbalanced, thus decreasing the usefulness of the method for visualization or as a basis for divide-and-conquer algorithms.

These balance problems, which occur even though the spectral method's quotient-style objective function does encourage balance, can be fixed with a stricter balance constraint that turns the spectral mathematical program into an SDP that can be solved for million-node graphs by a method of Burer and Monteiro.

Venue: Seminar Room, Hamilton Institute, Rye Hall
NUI Maynooth

Time: 1.00 - 2.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie



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