Title

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Abstract

Orecchia Sachdeva Vishnoi (2011) gives a spectral algorithm for balanced cut, that is $O(m/\tau)$ time. It takes in a parameter b that's balance and conductance $\tau \leq 1$, and outputs whether a cut with balance b and conductance $\leq \sqrt{\tau}$ is possible, or whether all cuts have conductance $\geq \tau$.

There is a gap here: if the best conductance is exactly τ, the algorithm only guarantees that a cut of conductance $\sqrt{\tau}$ can be found.

However, can you binary search on this? For instance, in this case, can I reduce my parameter τ to $\tau^{1.5}$, and re-run this algorithm?