

600.464/664 Randomized Algorithms

Assignment 6

Due April 9, 2009

- I. Let G be a simple cycle of length n . For its RW Markov chain (with loop probabilities of $1/2$), compute a lower bound for $1 - \lambda_2$ by the canonical path method by making use of $\phi \geq \frac{1}{2\rho}$, and $1 - \lambda_2 \geq \frac{\phi^2}{2}$.
- II. Let G be a degree d undirected graph, and let its RW Markov chain be ergodic. (i.e. G is connected and aperiodic). Compute a lower bound for $1 - \lambda_2$ by the canonical path method.
- III. If, in addition, G has a spanning tree which is a complete binary tree, compute a lower bound for $1 - \lambda_2$ by applying $1 - \lambda_2 \geq \frac{1}{\hat{\rho}}$
- IV. Analyze the bit-saving algorithm for any general $\lambda_2 < 1$, and any BPP algorithm with an error of ϵ . The algorithm samples the next address after a single step of the walk.