

Derandomized Graph Products

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Abstract

Berman and Schnitger [10] gave a randomized reduction from approximating MAXSNP problems [24] within constant factors arbitrarily close to 1 to approximating clique within a factor of n^{ϵ} (for some ϵ). This reduction was further studied by Blum [11], who gave it the name *randomized graph products*. We show that this reduction can be made deterministic (derandomized), using random walks on expander graphs [1]. The main technical contribution of this paper is in *lower bounding* the probability that all steps of a random walk stay within a specified set of vertices of a graph. (Previous work was mainly concerned with *upper bounding* this probability.) This lower bound extends also to the case that different sets of vertices are specified for different time steps of the walk.