



Mathematics > Probability

Cover times for sequences of Markov chains on random graphs

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(Submitted on 2 Jun 2012)

We provide conditions that classify cover times for sequences of random walks on random graphs into two types: One type (type 1) is the class of cover times approximated by the maximal hitting times scaled by the logarithm of the size of vertex sets. The other type (type 2) is the class of cover times approximated by the maximal hitting times. The conditions are described by the volumes, the diameters with respect to the resistance metric, and geometric properties of random graphs. Type 1 is characterized by a large set of well-separated vertices concerning the resistance metric, and type 2 is characterized by a good sequence of coverings or partitions of the vertex set. Applying the conditions, we estimate and classify cover times for a number of examples. For instance, we show that cover times for the supercritical Galton-Watson trees are type 1 and cover times for the incipient infinite cluster of the critical Galton-Watson tree and the Sierpinski gasket graph are type 2.

Comments: 24 pages, 1 figure

Subjects: **Probability (math.PR)**

MSC classes: 60J10

Cite as: [arXiv:1206.0398](#) [math.PR]

(or [arXiv:1206.0398v1](#) [math.PR] for this version)

Submission history

From: Yoshihiro Abe [[view email](#)]

[v1] Sat, 2 Jun 2012 19:12:00 GMT (20kb)

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