Constructing a Perfect Matching is in Random NC

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Abstract

We show that the problem of constructing a perfect matching in a graph is in the complexity class Random NC; i.e., the problem is solvable in polylog time by a randomized parallel algorithm using a polynomial –bounded number of processors. We also show that several related problems lie in Random NC. These include:

- Constructing a perfect matching of maximum weight in a graph whose edge weights are given in unary notation;
- Constructing a maximum-cardinality matching;
- Constructing a matching covering a set of vertices of maximum weight in a graph whose vertex weights are given in binary;
- Constructing a maximum $s-t$ flow in a directed graph whose edge weights are given in unary.