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Approximating the Tutte polynomial. (English) [Zbl 1130.05016](#)

Grimmett, Geoffrey (ed.) et al., Combinatorics, complexity, and chance. A tribute to Dominic Welsh. Oxford: Oxford University Press (ISBN 0-19-857127-5/hbk). Oxford Lecture Series in Mathematics and its Applications 34, 144-161 (2007).

Tomás Feder and Milena Mihail introduced balanced matroids in [Proceedings of the Twenty Fourth Annual ACM Symposium on Theory of Computing, 4-6 May 1992, Victoria, British Columbia, Canada, STOC, 26–38 (1992)] where they also presented a polynomial time algorithm for approximating the number of bases in these matroids. The scope is widened here from approximating the number of bases to the problem of approximately evaluating the Tutte polynomial for matroids. After a careful definition and development of the concept of fully polynomial randomized approximation scheme, FPRAS, the author derives that there is an FPRAS for estimating the number of bases of a balanced matroid (as defined by Feder and Mihail), with run time $O(rm^3 \log m)$, where r is the rank of the matroid and m is the size of its ground set. Moreover, a good review is given of what is known about the computational complexity of approximating the Tutte polynomial. The paper ends with some optimistic and some pessimistic speculations.

For the entire collection see [\[Zbl 1108.05004\]](#).

Reviewer: [Herman J. Servatius \(Worcester\)](#)

MSC:

[05B35](#) Combinatorial aspects of matroids and geometric lattices

Cited in **3** Documents

Keywords:

[Tutte polynomial](#); [randomised approximation scheme](#); [balanced matroid](#)