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Additive preconditioning for matrix computations. (English) [Zbl 1142.68607](#)

Hirsch, Edward A. (ed.) et al., Computer science – theory and applications. Third international computer science symposium in Russia, CSR 2008 Moscow, Russia, June 7–12, 2008. Proceedings. Berlin: Springer (ISBN 978-3-540-79708-1/pbk). Lecture Notes in Computer Science 5010, 372-383 (2008).

Summary: Our weakly random additive preconditioners facilitate the solution of linear systems of equations and other fundamental matrix computations. Compared to the popular SVD-based multiplicative preconditioners, these preconditioners are generated more readily and for a much wider class of input matrices. Furthermore they better preserve matrix structure and sparseness and have a wider range of applications, in particular to linear systems with rectangular coefficient matrices. We study the generation of such preconditioners and their impact on conditioning of the input matrix. Our analysis and experiments show the power of our approach even where we use very weak randomization and choose sparse and/or structured preconditioners.

For the entire collection see [\[Zbl 1136.68005\]](#).

MSC:

[68W20](#) Randomized algorithms

[65F10](#) Iterative numerical methods for linear systems

Cited in **1** Review
Cited in **7** Documents

Keywords:

[Matrix computations](#); [Additive preconditioning](#); [Weak randomization](#)

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