15th International Conference on Domain Decomposition Methods
July 21-25, 2003, Berlin, Germany

Algebraic Analysis of Schwarz Methods for Singular Systems

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Abstract: Recently, an algebraic formulation of additive and multiplicative Schwarz method was developed. In this paper we use this algebraic formulation to prove new convergence results for these methods when applied to singular systems of linear equations. In particular, we apply these to the numerical solutions of Markov chains.

[1] M. Benzi, A. Frommer, R. Nabben, and D.B. Szyld. *Algebraic theory of multiplicative Schwarz methods.* Numerische Mathematik, 89:605–639, 2001.

[2] A. Frommer and D.B. Szyld. *Weighted max norms, splittings, and overlapping additive Schwarz iterations.* Numerische Mathematik, 83:259–278, 1999.

[3] R. Nabben. *Comparisons between additive and multiplicative Schwarz iterations in domain decomposition methods.* Numerische Mathematik, on line, 18 February 2003, to appear in print.

[4] I. Marek and D.B. Szyld. *Algebraic Schwarz Methods for the Numerical Solution of Markov Chains.* Research Report, Temple University, March 2003.

Type of contribution: Talk
Location: Room 005, **Time:** Monday, 21 July, 12:00

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