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A PRECONDITIONING METHOD OF ILL CONDITIONED MATRICES USING WAVELET BASES

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Abstract After discretizations with respect to two different wavelet bases of the partial differential equations (PDEs), we obtain a big sparse ill-conditioned linear system of equations. For discretizing of PDEs with wavelet method, this paper presents a preconditioning technique for linear systems involving the operator such that the system becomes a sparse systems in the wavelets basis. In fact the condition number of the matrix involved in the solution of PDEs, after a diagonal preconditioning appears to be bounded. The orthogonal property of the wavelets is used to construct efficient iterative methods for the solution of the resultant linear algebraic systems.

MSC: 65F35, 65F25

Keywords: preconditioning technique, Wavelets bases, Wavelet-Galerkin method.