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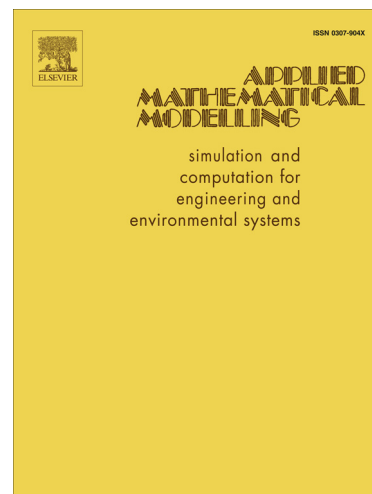
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The comparisons of two special Hermitian and skew-Hermitian splitting methods for image restoration

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Abstract

In this paper, on the basis of an augmented linear system we propose a new special Hermitian and skew-Hermitian splitting iteration method for solving the linear systems which come from image restoration. The convergence analysis and some comparisons are also shown.

Key words: Hermitian and skew-Hermitian splitting; alternating iteration method; image restoration

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1 Introduction

We consider the following data production model for image restoration [1, 2]:

$$g = Af + \eta, \quad (1)$$

where $A \in R^{n^2 \times n^2}$ is a system matrix, $\eta \in R^{n^2}$, $f \in R^{n^2}$ and $g \in R^{n^2}$ represent the noise, the original image, and the blurred and noisy image, respectively. In general, A is a large and ill-conditioned matrix. The Tikhonov regularization method [3, 4] is used to solve the system (1). So, we transform (1) into an equivalent system as follows:

$$\min_f \|Af - g\|_2^2 + \mu^2 \|Lf\|_2^2, \quad (2)$$

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