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论文

解大规模非对称线性方程组的Lanczos方法和精化Lanczos方法

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摘要:

引言科学工程计算的核心问题之一是数值求解大规模线性方程组,即给定n阶非奇异的非对1期贾仲孝等:解大规模非对称线性方程组的Lanczos方法和精化Lanczos方法称矩阵A和n维向量b,求一个。维向量x,使得Ax=b.(I)观察到该问题可以转化为

关键词:

A LANCZOS METHOD AND A REFINED LANCZOS METHOD FOR LARGE UNSYMMETRIC LINEAR SYSTEMS

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Abstract:

A large unsymmetric linear system problem is transformed into the problem of computing the eigenvector of a large symmetric nonnegative definite matrix associated with the eigenvalue zero, i.e., the computation of the eigenvector of the cross-product matrix of an augmented matrix associated with the eigenvalue zero. The standard Lanczos method and an improved refined Lanczos method are proposed that compute approximate eigenvectors and return approximate solutions of the linear system. An implicitly restarted Lanczos algorithm and its refined version are developed. Theoretical analysis and numerical experiments show the refined method is better than the standard one. If the large matrix has small eigenvalues, the two new algorithms are much faster than the unpreconditioned restarted GMRES.

Keywords:

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