

论文

迭代矩阵谱半径的界限

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摘要:

为求解线性方程组Ax=b,常将矩阵A分解为A=M-N,这里M为非奇异矩阵.我们知道,得到的迭代格式x(k+1)=M-1Nx(k)+M-1b(k=0,1,2,...)对任意初始向量x(0)都收敛到解x=A-1b,当且仅当M-1N的谱半径ρ(M-1N)<1,其中M-1N称为迭代矩阵.因此,估计ρ(M-1N)的界限就成了一个热点问题.我们首先推广了由Hoffman等提出的G-函数的概念,其次应用这一概念得到了迭代矩阵特征值模的界限.作为应用,得到了解线性方程组迭代矩阵M-1N的谱半径的界限,改进了已有的结论.最后用数值例子说明了所给结果的优越性.

关键词: 迭代法 广义G-函数 谱半径

Bounds for spectral radii of iterative matrices

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Abstract:

For solving a system of linear equations with the form of Ax=b,it often splits A into A=M-N, Where M is nonsingular. It is known that x(k+1)=M-1Nx(k)+M-1b (k=0,1,2,...) converges to the solution x=A-1b for each x(0) if and only if spectral radius ρ(M-1N)<1. The matrix M-1N is called an iterative matrix. It is easy to see the estimates for bounds of ρ(M-1N) are interested.A concept of G-functions introduced by Hoffman and Nowosad was introduced to generalized G-functions,and the concept generalized G functions were applied to obtain the bounds for moduli eigenvalues of the iterative matrices. The bounds for spectral radii of iterative matrices M-1N were obtained and applied for solving linear systems. The obtained results improve the known corresponding results. Finally, a numerical example was given for illustrating the advantage of the results.

Keywords: iteration generalized G-function eigenvalue spectral radius

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