计算机工程与应用 2009 45 (25): 62-64 ISSN: 1002-8331 CN: 11-2127/TP

研究、探讨

基于区间—遗传算法求解非线性方程组

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收稿日期 2008-5-15 修回日期 2008-8-11 网络版发布日期 2009-9-8 接受日期

摘要 将非线性方程组的求解转化为函数优化问题，结合遗传算法的群体搜索、全局收敛的优点，及区间算法特有的解的存在性检验准则，提出了一种区间—遗传算法。在迭代计算过程中，区间算法为遗传算法搜索提供可靠区域，同时遗传算法为区间算法提供安全的初始区域。数值实验表明，该算法能够在较大范围的初始区间内快速，可靠地迭代得到高精度的区间解，是求解非线性方程组的一种有效的算法。

关键词 区间算法 遗传算法 非线性方程组

分类号 TP18

Solving nonlinear systems via interval-genetic algorithm

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Abstract

The problem on solving nonlinear equations is transformed into that of function optimization.A new Interval-Genetic Algorithm（IGA） is presented via combination of genetic algorithm and interval algorithm.The algorithm has the advantages of the genetic algorithm such as group search and global convergence and the interval algorithm such as the special computational test for the existence of a solution.At each iteration the interval algorithm provides the reliable domain for the genetic algorithm to search，and the genetic algorithm gives the safe starting regions to the interval algorithm.Finally，numerical experiments show that the IGA has global convergence，high convergence rate and solution precision，and is a reliable approach in solving nonlinear equations.

Key words interval algorithm genetic algorithm nonlinear equations

DOI: 10.3778/j.issn.1002-8331.2009.25.019

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