

消去树理论及其在潮流计算中的应用

徐得超¹, 李亚楼¹, 郭 剑¹, 于之虹¹, 金 丽²

1. 中国电力科学研究院, 北京市 海淀区 100085; 2. 新疆准东石油技术股份有限公司, 新疆维吾尔自治区 阜康市 831511

收稿日期 修回日期 网络版发布日期 接受日期

摘要

采用了基于消去树理论的符号因子分解技术以及改进的LU数值分解算法来提高牛顿法潮流计算的效率。介绍了消去树理论, 并采用符号因子分解技术确定雅可比矩阵的结构, 然后采用稀疏向量法求取L阵的每行和U阵的每列。这种算法和求取L阵每列和U阵每行的传统LU分解方法相比, 具有编程简单、计算效率高的优点。另外, 雅可比矩阵结构对称以及编译器优化的经验也应用到文中, 使得算法不仅占用内存较少, 且效率较高。算法的优越性在实际系统中得到了验证。

关键词 [潮流](#); [消去树](#); [符号因子分解](#); [稀疏向量法](#); [LU分解](#)

分类号 [TM712](#)

Elimination Tree Theory and Its Application in Power Flow Calculation

XU De-chao¹, LI Ya-lou¹, GUO Jian¹, YU Zhi-hong¹, JIN Li²

1. China Electric Power Research Institute, Haidian District, Beijing 100085, China;
2. Xinjiang Zhundong Petroleum Technology Company Limited, Fukang 831511, Xinjiang Uygur Autonomous Region, China

Abstract

By use of symbolic factorization based on elimination tree theory and improved LU numerical decomposition algorithm based on sparse vector method, the efficiency of power flow calculation by Newton-Raphson method is improved. In this paper, firstly the elimination tree theory is introduced in brief, and the structure of Jacobian matrix is determined by use of symbolic factorization; then by use of sparse vector method each column of lower triangular matrix L and each row of upper triangular matrix U are solved. Comparing with traditional LU numerical decomposition algorithm to solve each row of lower triangular matrix L and each column of upper triangular matrix U, the proposed method is easy to program and efficient. In addition, the structure symmetry of Jacobian matrix and the experience of compiler optimization are also adopted in this research, it makes less required memory for the proposed algorithm and higher calculation efficiency. The superiority of the proposed method is validated in actual power system.

Key words [load flow](#); [elimination tree](#); [symbolic factorization](#); [sparse vector method](#); [LU decomposition](#)

DOI:

通讯作者

作者个人主页 徐得超¹; 李亚楼¹; 郭 剑¹; 于之虹¹; 金 丽²

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(223KB\)](#)
- ▶ [\[HTML全文\]\(OKB\)](#)
- ▶ [参考文献\[PDF\]](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中包含“潮流; 消去树; 符号因子分解; 稀疏向量法; LU分解”的相关文章](#)
- ▶ 本文作者相关文章

- [徐得超](#)
- [李亚楼](#)
- [郭 剑](#)
- [于之虹](#)
- [金 丽](#)