

电力系统

基于整数小波变换的Ray-Period压缩算法

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收稿日期 2007-4-16 修回日期 网络版发布日期 2008-3-24 接受日期

摘要

为解决基于传统小波变换的数据压缩方法存在的问题, 在深入分析整数提升过程的基础上, 提出了一种基于整数小波变换的Ray-Period压缩算法。该算法针对电力数据的特点, 根据整数小波变换多分辨率分析的特性, 将原始数据变换到小波域, 以使变换后的信号能量主要集中在低频系数上, 而后采用无损的Ray-Period压缩算法处理低频数据, 采用改进的阈值压缩算法处理高频系数, 并采用新的位图压缩算法处理阈值压缩后元素值超过3.125%时的非零元素。采用实际数据进行压缩, 该算法的能量恢复系数优于 10^{-4} , 压缩比小于6.39%, 速度比传统的小波变换压缩算法提高了近1倍。

关键词

[数据压缩](#); [提升算法](#); [整数小波变换](#); [Ray-Period](#); [阈值](#)

分类号 [TP391](#)

A Ray-Period Compression Algorithm Based on Integer Wavelet Transform

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Abstract

To solve the problems existing in data compression methods based on traditional wavelet transform, on the basis of analyzing integer lifting process in depth, a Ray-Period compression algorithm based on integer wavelet transform is proposed. Considering the features of power system data and according to the property of multi-resolution analysis of integer wavelet transform, the original data is transformed into wavelet domain to make the transformed signal energy mainly centralized to low-frequency coefficients. Then the low-frequency data is processed by lossless Ray-Period compression algorithm and the improved threshold value compression algorithm is adopted to process high-frequency coefficients, and as to such non-zero coefficients whose percentages of post-compressed threshold value are greater than 3.125% a novel bitmap compression algorithm is used to process them. The results of compression experiments using actual data prove that the energy recovery coefficient of the proposed compression algorithm can be better than 10^{-4} , the data compression ratio can be as small as 6.39%, and the data compression speed is about twice faster than the algorithms based on the traditional wavelet transform.

Key words

[data compression](#); [lifting algorithm](#); [integer wavelet transform](#); [Ray-Period](#); [threshold value](#)

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