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论文

基于自适应分数阶傅里叶变换的线性调频信号检测及参数估计

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摘要
该文提出了一种基于最小均方算法的自适应计算分数阶傅里叶变换的方法并将该方法应用到多分量chirp信号的检测与估计之中。该方法通过对连续型分数阶傅里叶反变换进行离散化采样，得到适合数值计算的离散形式，进而通过适当的选择输入向量和目标函数构造自适应滤波器，经过最小均方算法进行训练后所得的滤波器权系数即为分数阶傅里叶变换的结果。仿真实验表明，该方法可以用来计算分数阶傅里叶变换及对chirp信号进行检测和参数估计，且计算延时相对较小。

关键词 分数阶傅里叶变换 自适应滤波 Chirp信号 参数估计

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Adaptive Fractional Fourier Transform Based Chirp Signal Detection and Parameter Estimation

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Abstract
An adaptive method of fractional Fourier transform based on Least Mean Square (LMS) algorithm is proposed and is used to detect and estimate parameters of multicomponent chirp signals. Through the discrete sampling of continuous inverse fractional Fourier transform, a discrete form for numerical calculation is obtained, and then an adaptive filter is constructed with the appropriate choices of the input vector and the desired sequence. The weight vector of the adaptive filter is trained according to LMS algorithm, and the stable weight vector is just the result of fractional Fourier transform. The simulation results show that the proposed algorithm can be used to calculate fractional Fourier transform and to detect and estimate parameters of chirp signals and the delay of calculation is relatively small.

Key words Fractional Fourier transform Adaptive filter Chirp signal Parameter estimation

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