自动化学报 2007 33 (9): 931-935 ISSN: 0254-4156 CN: 11-2109/TP

论文与报告

自适应扩散算法与差分法结合用于检测非平稳信号

谭小刚, 李立萍, 魏平

School of Electronic Engineering, University of Electronic Science and Technology of China (UESTC), Chengdu 610054, P.R. China

收稿日期 2006-9-4 修回日期 2007-2-7 网络版发布日期 接受日期

摘要

Time-frequency analysis aims to construct a density function of time and frequency to reveal the frequency components in signals to be analyzed and the evolution of the frequency of signals with time. The Wigner distribution (WD) is one of the most fundamental and widely used methods for analyzing nonstationary signals in the fields of radar, communication, etc. However, the application of the WD is greatly limited by the existence of interference terms. The adaptive diffusion method proposed to remove the interference terms of the WD by Julien Gosme, et al. is to be invalid in the presence of interference terms generated by signals, whose distributions are interwoven together in the time-frequency plane of the WD. We combine the diffusion technique with difference method for removing these interference terms to improve the resolution and readability of the time-frequency representation of the Cohen class for detecting nonstationary signals.

关键词 Adaptive diffusion interference terms signal-dependent kernel function nonstationary signal

分类号

Combining Adaptive Diffusion with Difference for Detecting Nonstationary Signals

TAN Xiao-Gang, LI Li-Ping, WEI Ping

School of Electronic Engineering, University of Electronic Science and Technology of China (UESTC), Chengdu 610054, P.R. China

Abstract

Time-frequency analysis aims to construct a density function of time and frequency to reveal the frequency components in signals to be analyzed and the evolution of the frequency of signals with time. The Wigner distribution (WD) is one of the most fundamental and widely used methods for analyzing nonstationary signals in the fields of radar, communication, etc. However, the application of the WD is greatly limited by the existence of interference terms. The adaptive diffusion method proposed to remove the interference terms of the WD by Julien Gosme, et al. is to be invalid in the presence of interference terms generated by signals, whose distributions are interwoven together in the time-frequency plane of the WD. We combine the diffusion technique with difference method for removing these interference terms to improve the resolution and readability of the time-frequency representation of the Cohen class for detecting nonstationary signals.

Key words Adaptive diffusion interference terms signal-dependent kernel function nonstationary signal

DOI: 10.1360/aas-007-0931

通讯作者 谭小刚 xgtan1971@163.com

作者个人主页 谭小刚; 李立萍; 魏平