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# 自相关法单频干扰识别与消除方法

高少武[1,2], 赵波[2], 祝树云[2], 罗国安[2], 贺振华[1]*

1. 成都理工大学油气藏地质与开发工程国家重点实验室,成都 610059;
2. 中国石油集团东方地球物理公司物探技术研究中心,涿州 072750

## Identification and elimination of monofrequency interference in seismic data by an autocorrelation algorithm

GAO Shao-Wu[1,2], ZHAO Bo[2], ZHU Shu-Yun[2], LUO Guo-An[2], HE Zhen-Hua[1]*

1. State Key Laboratory of Oil and Gas Reservoir Geology and Exploitation, Chengdu University of Technology, Chengdu 610059, China;
2. Geophysical Technique Research Center, BGP, CNPC, Zhuozhou 072750, China

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**摘要** 常规单频干扰压制方法需要估算频率、振幅和相位,由于频率和相位与单频干扰呈非线性函数关系,因此任何参数估算方法都会非常费时,且计算效率低下. 本文提出的自相关法单频干扰识别与消除方法,利用地震数据自相关函数计算单频干扰自相关函数,采用余弦函数自适应减算法快速估算单频干扰. 本方法不需要估算单频干扰的频率、相位和振幅参数,因此可以高效快速地估算出单频干扰并予以消除. 本方法最突出优点是能够快速有效地消除单频干扰,且不伤害干扰附近的有效信号,提高了单频干扰频率分量附近数据的信噪比. 合成数据和实际数据试算结果表明该方法是有效和可行的.

关键词：　地震数据采集　单频干扰　信噪比　自适应减算法　自相关法

Abstract： Traditional monofrequency interference (MFI) suppression methods need to estimate the frequency, phase and amplitude of the MFI. However, a MFI has a nonlinear relationship with the frequency and phase parameters, and any parameter estimation is time consuming, its computational efficiency is very low. In the autocorrelation algorithm (ACA) proposed in this paper, the autocorrelation function of the MFI is computed by seismic records. Following that, the MFI is quickly estimated by a cosine function adaptive subtraction algorithm. The proposed method need not estimate the frequency, phase and amplitude of the MFI, so the MFI can be high-efficiently estimated and eliminated. The most prominent advantage of the ACA is that only interference with MFI component can be quickly and effectively eliminated, and useful signals have not been harmed. Therefore, the signal-to-noise ratio is improved in the vicinity of a MFI frequency component. The synthetic and real data examples illustrate that the proposed method is feasible and effective.

Keywords： Seismic data acquisition　Monofrequency interference　Signal-to-noise ratio　Cosine function adaptive subtraction algorithm　Autocorrelation algorithm

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