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论文

利用Hilbert变换计算重力归一化总梯度

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摘要： 针对提高重力勘探正反演解释的分辨率问题，提出利用Hilbert变换计算和研究重力归一化总梯度.文中从理论上详细地证明了方法的可行性，给出了适合计算机实现的计算方法.为探讨该方法对油气藏的分辨能力，在模型计算中，分别利用Fourier级数法、Fourier变换法和本文提出的Hilbert变换法计算模型的 G H场值，发现当三度体储油球冠模型（模拟似三度贮油气藏背斜模型）油气藏部分（低密度体）厚度减小到低于球冠厚度的十分之一时，Fourier级数及变换法不能分辨出低密度体所产生的异常，而Hilbert变换法仍然可以清晰地识别，这说明用Hilbert变换法计算的 G H场对异常识别的分辨率优于其他两种方法.

关键词： Hilbert变换　重力归一化总梯度　三度体球冠　分辨率

Calculating normalized full gradient of gravity anomaly using Hilbert transform

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Abstract: We propose a method of calculating normalized full gradient of gravity anomalies using Hilbert transform in order to improve the resolution of geophysical data processing. We prove the feasibility of the method in theory

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and illustrate the calculating way that can be performed in computer. We calculate the G H field value of a model using methods of Fourier series, Fourier transform and Hilbert transform respectively and discuss the resolution for oil bearing structures with the methods. The result indicates that the methods of Fourier series and Fourier transform cannot distinguish the anomaly of the low density body but the method of Hilbert transform can fairly do when the thickness of the oil storage part (low density body) of 3 D sphere coronal (approximate model of 3 D oil storage anticline) is lower than one tenth of it of sphere coronal. It demonstrates that the resolution of discerning anomaly in computing the G H field value using Hilbert transform is much better than that of other two methods.

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