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TTI介质各向异性参数多波反演与PS波AVO分析

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Multiwave inversion of anistropic parameter and PS wave AVO analysis in TTI media

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摘要 把遗传算法引入到了TTI介质AVO信息反演各向异性参数的过程中,依据TTI介质PP波、PS波反射系数公式,建立Thomsen参数和TTI介质对称轴倾角、方位角的目标函数,分别通过PP波和PS波的反射系数反演出了各向异性参数和对称轴倾角、方位角等信息.文中对反演结果的精确度和稳定性进行了分析,发现PS波的反演结果优于PP波反演结果;对称轴倾角的反演准确性明显优于对称轴方位角.本文通过模型正演合理解释了这一现象的原因.最后,本文通过对PS波AVO梯度的研究,提出了利用PS波振幅定性分析TTI介质对称轴倾角的方法.

关键词 TTI介质, Thomsen参数, 遗传算法, AVO反演

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Abstract: In this paper, genetic algorithm is introduced in the process of AVO inversion for anistropic parameters in TTI media. According to the reflection coefficients of PP and PS waves in TTI media, we found the objective function of Thomsen parameters and the dip angle and the azimuth angle of the symmetry in TTI media, determined the anisotropic parameters and the dip angle, azimuth angle of the symmetry from inversion of the reflection coefficients of the PP wave and the PS wave. We analysed the accuracy and stability of the inverse outcome, found that the inverse outcome of PS wave is better than the outcome of PP wave and the veracity of the symmetry dip angle is significantly higher than that of symmetry azimuth angle. By the forward modeling we explained why this happened. Finally, by the research of PS wave AVO gradient, a method is proposed by which we can qualitatively analyze the symmetry dip angle of TTI media.

Keywords TTI media, Thomsen parameters, Genetic algorithm, AVO inversion

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