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套管非匀质性对过套管电阻率测井影响的数值模拟与分析

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Numerical simulation and analysis on the influence of casing inhomogeneity on through-casing resistivity logging response

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摘要

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摘要

套管非匀质性对于过套管电阻率测井响应会产生显著影响.首次采用数值模式匹配法模拟过套管电阻率测井响应,在此基础上分析了各种套管局部变化对于测井响应的影响.模拟结果表明,套管异常区域及其附近的测井响应出现异常变化,异常变化程度与套管参数局部变化程度呈现正相关性;通过模拟不同类型电极系还发现,双注入电极系对套管非匀质性具有很好的补偿作用.文中首次模拟了井温梯度对过套管电阻率测井响应的影响.计算结果表明,该数值方法能够很好地解决包含套管非匀质性因素的过套管电阻率测井数值模拟问题.

关键词 过套管电阻率测井, 套管非匀质性, 数值模拟, 数值模式匹配法

Abstract:

Casing inhomogeneity has remarkable influences on through-casing resistivity logging response. The numerical mode-matching method (NMM) is first used to simulate through-casing resistivity logging response. On the basis, the effects of casing local variations on logging response are analyzed. Simulating results show that abnormal variations of logging response appear in and nearby inhomogeneous sections. The anomaly degree has a positive correlation to casing parameters changing degree. By simulating different electrodes, it is revealed that DIE (double injected electrodes) have a good compensation to the influence of casing inhomogeneity. The influence of well temperature gradients is analyzed for the first time. Calculation results show that the algorithm can solve through-casing resistivity logging simulation with casing inhomogeneity effectively.

Keywords [Through-casing resistivity logging](#), [Casing Inhomogeneity](#), [Numerical simulation](#), [Numerical Mode-Matching method \(NMM\)](#)

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