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RESEARCH PAPERS

多层合采油藏最大有效井径数学模型及精确解

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摘要 The maximum effective hole-diameter mathematical model describing the flow of slightly compressible fluid through a commingled reservoir was solved rigorously with consideration of wellbore storage and different skin factors. The exact solutions for wellbore pressure and the production rate obtained from layer j for a well production at a constant rate from a radial drainage area with infinite and constant pressure and no flow outer boundary condition were expressed in terms of ordinary Bessel functions. These solutions were computed numerically by the Crump's numerical inversion method and the behavior of systems
was studied as a function of various reservoir parameters. The model was compared with the real wellbore radii model. The new model is numerically stable when the skin factor is positive and negative, but the real wellbore radii model is numerically stable only when the skin factor is positive.

关键词 well-testing mathematical model effective hole diameter layered reservoir
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Maximum Effective Hole Mathematical Model and Exact Solution for Commingled Reservoir

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Abstract The maximum effective hole-diameter mathematical model describing the flow of slightly compressible fluid through a commingled reservoir was solved rigorously with consideration of wellbore storage and different skin factors. The exact solutions for wellbore pressure and the production rate obtained from layer j for a well production at a constant rate from a radial drainage area with infinite and constant pressure and no flow outer boundary condition were expressed in terms of ordinary Bessel functions. These solutions were computed numerically by the Crump's numerical inversion method and the behavior of systems was studied as a function of various reservoir parameters. The model was compared with the real wellbore radii model. The new model is numerically stable when the skin factor is positive and negative, but the real wellbore radii model is numerically stable only when the skin factor is positive.

Key words well-testing; mathematical model; effective hole diameter; layered reservoir

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