

# Non-uniform Finite Difference Method Applied to Fractal Dual-Porosity Reservoir Equations

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## Abstract

The telegraphic equation allows to model petroleum reservoir incorporating finite time propagations from disturbance effects arising from the wellbore boundary conditions. As we can see, due to the long time scale at which predictions are needed, the finite difference method with uniform meshes is useless for this type of transient reservoir simulations. In this work, we solve the fractal telegraphic dual porosity equation using a non-uniform finite difference method in order to speed up the temporal advance. This numerical scheme together with parallel implementations leads to affordable running time. The  $\theta$ -scheme [ $\theta = 0$  (explicit method), 1 (fully implicit method), and 1/2 (Crank-Nicolson method)] is studied and the stability is compared against the Warren and Root equation with fractal considerations.

## References

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