Conditional Simulation of Operator-Scaling Random Fractals

D. A. Benson

[1]*Colorado School of Mines, Golden, CO,USA*

ABSTRACT: Aquifer material properties are often observed to possess a hierarchy of scales that indicate a random fractal structure. One should not expect that the scaling is the same in all directions. Indeed, well-studied sedimentary material is found to have different scaling (Hurst) coefficients in different directions. One way to handle this is by generalizing random fractals to have matrix (operator) scaling. We show the novel methods to generate these random fields in multiple dimensions including any degree of conditioning with real measured data. The effects of operator-scaling on transport rates can be profound due to connectivity of high permeability material.