SPE 92039: [**New Analytical Pressure-Transient Models to Detect and Characterize Reservoirs with Multiple Fracture Systems**](http://www.spe.org/elibrary/servlet/spepreview?id=00092039).

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**Abstract:** This paper presents two new pressure-transient models for naturally fractured reservoirs. The analytical models consider flow in a quadruple-porosity system that consists of a triple-fracture network with a single-matrix system. The models are used to investigate the pressure-transient characteristics of quadruple-porosity systems. They can also be used to detect, characterize, and simulate naturally fractured reservoirs with quadruple-porosity characteristics. It is shown that the fracture interconnectivity can be determined from pressure-transient tests if the combined fracture storativity is sufficiently large and the matrix contribution can be unambiguously isolated. Regression analysis of pressure-transient tests in naturally fractured reservoir with quadruple-porosity behavior is also discussed. It is demonstrated that the standard regression techniques are very sensitive to the scatter of the pressure vs. time data.