A Numerical Study of Fractured Reservoirs’ Productivity Behavior through Coupled Hydromechanical Model

In this study, we develop a state-of-the-art coupled hydromechanical model that captures the spatial and temporal evolution of fractures’ aperture. Subsequently, a set of numerical experiments, which considers coupled hydromechanics features, is designed to investigate an inflow performance relationship of fractured reservoirs. In this work, we construct an inflow performance relationship based on multi-rate test concept. Fracture geometry (i.e., different sets of fractures), initial pressure, stresses in horizontal directions, deformable parameters and matrix permeability are utilised to investigate factors that affect productivity behaviour of the system. Our study shows that the inversion of productivity index takes either a quadratic or linear form depending on a permeability contrast between fractures and matrix. Furthermore, quadratic coefficients depend on all the investigated factors. However, the contrast between the magnitude of second- and first-order coefficients mainly depends on the contrast between matrix and fractures’ conductivity or permeability. Hence, we conclude that deliverability reduction due to reservoir depletion in fractured reservoirs becomes more severe when the contrast between matrix and fractures’ conductivity grows.

General information
Publication status: Published
Organisations: Centre for oil and gas – DTU, Department of Applied Mathematics and Computer Science
Contributors: Kadeethum, T., Jahanbani Veshareh, M., Salimzadeh, S., Nick, H.
Number of pages: 5
Publication date: 2018
Peer-reviewed: Yes
Event: Paper presented at 80th EAGE Conference and Exhibition 2018, Copenhagen, Denmark.
Source: PublicationPreSubmission
Source ID: 147877318
Research output: Contribution to conference › Paper – Annual report year: 2018 › Research › peer-review