Numerical simulation of fluid flow and heat transfer in naturally fractured geothermal reservoir using DFN method with matrix flow

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Natural fractures have an effect on the fluid flow and heat transfer in the naturally fractured geothermal reservoir. However, most of the previous works in this area assumed that reservoir systems are continuum model whether it is single continuum or dual continuum. Moreover, some people have studied without continuum model but, it was just pipeline model or didn't calculate heat and fluid flow from matrix. In this paper, we developed a generalized discrete fracture network (DFN) geothermal reservoir simulator consiering fluid flow and heat transfer from matrix. In the model, 2D flow is possible within a rectangular fracture, which is important in thick naturally fractured reservoirs. Also, it can calculate heat conduction between matrix and fracture and matrix can increase temperature of injected water. The DFN model developed in this study was validated for two synthetic fracture systems using a commercial thermal model, TETRAD. Comparison results showed an excellent matching between both models. However, this model is conducted at simple fracture network. Therefore, developed model will be conducted a test in realistic fracture network.