Fluid Flow Modeling in Single Fracture Using Cellular Automata Method

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ABSTRACT

Fluid flow simulation through a natural fracture is one of the most important and complex problem in Geomechanics. In general, various analytical and numerical methods are used to model fluid flow in fractures. Cellular automata method has been known as a powerful tool for simulation of complex phenomena such as fluid flow, fault movement and fracture production and propagation in a media. As a result, it can have predominant role on simulation of fluid flow in rock fractures.

In this study, the modeling of fluid flow in ideal fracture has been carried out employing cellular automata method. For this purpose, a computer program has been developed and used in Fortran Power Station Domain. In this paper, the cellular automata method has been introduced and its application in fluid flow modeling described. The method of fluid flow simulation has also been presented and the results compared with available analytical solution.

KEYWORDS

Fluid Flow, Single Fracture, Relative Roughness, Cellular Automata, Lattice Boltzmann.

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