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A NUMERICAL APPROACH FOR SINGLE-PHASE FLOW IN POROUS AND FRACTURED ROCKS

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Analysis of fluid flow through or/and over porous media has steadily received considerable attention due to its applications in Science and Engineering. Many analytical and numerical approaches have been developed to analyze fluid flow properties in porous media. In this study, we considered the pressure distribution in fluid saturated in fractured rocks. The fractured rocks were considered as a porous medium, and to model the flow through the fractured rocks, mass conservation and Darcy's law were used. The resulting governing equation is a parabolic-type partial differential equation. Directly solving these equations is not easy. Thus, this work uses a numerical approach based on the finite difference method and singular value decomposition method to solve the parabolic type governing equation. The forward Euler method is applied to the equations and the boundary conditions to obtain the numerical scheme. The resulting numerical scheme is solved using a computer program written in python. The results show a good agreement with the experimental solutions. Further, the results show how the pressure diffusion is distributed in the saturated fluid in the porous rocks. Future work will focus on finding the effect of the parameters in the saturated fluid in fractured rocks.

Keywords: Finite Difference Method, Porous media, Singular Value Decomposition