Development of 3-D fracture network visualization software based on graphical user interface

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A sound understanding of the structural characteristics of fractured rock masses is important in designing and maintaining earth structures because their strength, deformability, and hydraulic behavior depend mainly on the characteristics of discontinuity network structures. Despite considerable progress in understanding the structural characteristics of rock masses, the complexity of discontinuity patterns has prevented satisfactory analysis based on a 3-D rock mass visualization model. This research presents the results of studies performed to develop rock mass visualization in 3-D to analysis the mechanical and hydraulic behavior of fractured rock masses. General and particular solutions of non-linear equations of disk-shaped fractures have been derived to calculated lines of intersection and equivalent pipes. Also, program modules of DISK3D, FNTWK3D, BOUNDARY and BDM(borehole data management) have been developed to perform the visualization of fracture network and corresponding equivalent pipes for DFN based fluid flow model. The developed software for the 3-D fractured rock mass visualization model based on MS visual studio can be used to characterize rock mass geometry and network systems effectively. The results obtained in this study will be refined and then combined for use as a tool for assessing geomechanical problems related to strength, deformability and hydraulic behaviors of the fractured rock masses.