Use of Finite Analytic Method for Computation of Steady Failure Potential of Saturated Hillslope

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ABSTRACT

In this study, based on poro-elastic media theory and Mohr-Coulomb failure criteria, the steady failure potential of saturated hillslope is modeling by using finite analytic method integrated with diagonal Cartesian coordinates system. Due to the use of the local analytic solution for discritization, the analytic method is more accurate than the finite difference method. In addition, with Cartesian coordinates system the analytic method could easily tackle the simulation problems with irregular boundaries, so that the framework of the finite analytic method is simpler than that of the finite element method. However, the convectional finite analytic method can not be directly used herein. A variable transformation and interpolation technique is proposed in this study to extend the conventional finite analytic method to the more general form. The influences of different shapes of hillslope, porosity, possion's ratio, and the homogeneity of soil on steady failure potential of saturated hillslope are examined after the developed numerical program is verified by the exact solutions.

Key word hillslope failure potential finite analytic method diagonal Cartesian coordinates