عنوان مقاله:

A boundary element/finite difference analysis of subsidence phenomenon due to underground structures

محل انتشار:

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خلاصه مقاله:

Analysis of the stresses, displacements, and horizontal strains of the ground subsidence due to underground excavation in rocks can be accomplished by means of a hybridized higher order indirect boundary element/finite difference (BE/FD) formulation. A semi-infinite displacement discontinuity field is discretized (numerically) using the cubic displacement discontinuity elements (i.e. each higher order element is divided into four sub-elements bearing a cubic variation in the displacement discontinuities). Then the classical finite difference formulation (i.e. the backward, central, and forward finite difference formulations) is hybridized using the boundary element formulation, enabling us to obtain the nodal tangential stresses and horizontal strains along the elements. Several example problems are solved numerically, and the results obtained are then compared with their corresponding results available in the literature. These comparisons show the effectiveness and validness of the proposed method. A classical practical problem is also used to verify the applicability of the hybridized method.

کلمات کلیدی:

Subsidence, Horizontal strain, Semi-infinite problems, Indirect boundary element method, Finite Difference Method, Higher order elements