

Expanding element interpolation method for 2D crack problems

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Abstract

An expanding element is achieved by collocating virtual nodes along the perimeter of the traditional discontinuous element. There are two kinds of shape functions in the expanding element: (i) the raw shape function, i.e. shape function of the original discontinuous element, involving only inner nodes; (ii) the fine shape function, which involves all the nodes including inner nodes and the newly added virtual nodes. The expanding element inherits the advantages of both the continuous and discontinuous elements while overcomes their disadvantages. With the expanding element, both continuous and discontinuous fields can be accurately interpolated. In this paper, we apply the expanding element interpolation method to analysis of 2D crack problems. With the proposed method, more accurate stress intensity factor can be obtained.

Keywords: expanding element; boundary element method; stress intensity factor