THE FINITE ELEMENT METHOD APPLIED TO LIMIT ANALYSIS

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Abstract

Using a finite element representation for the stress and strain rate fields of a structure, the limit load determination is formulated as a mathematical programming problem. Bounding nature of the solutions obtained and the versatility of the finite element method is emphasized and other available approximate methods are critically examined.

The method is applied to selected examples in plane stress, plate bending and shell analysis, and improved upper and lower bounds for the limit load are obtained. Experiments are reported which investigated the plastic behaviour of clamped and simply supported square plates under uniform pressure. A study is made of the use of graphical display in finite element limit analysis and the possibility of predicting the post yield behaviour of structures using upper bound solutions is examined.