

عنوان مقاله:

Computational and Programming Aspects of Transition Elements in a Three-dimensional Finite Element Program

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خلاصه مقاله:

The performance of any finite element (FE) structural analysis is directly related to the global number of nodes and degrees of freedom (DOF) of the discretized structure and mesh distribution attributes. It is obvious that the appropriate numerical analysis needs finer elements in the zone of interest, e.g. zone of high stress concentration and intensity, and coarser elements for farther portion of the structure. The transition element concept achieves this aim and with variable number of nodes of each element in the transition zone it creates coarser elements in the outward zones of the discretized structure. These elements have larger size with variable number of nodes per element and their number of nodes is between the number of nodes per elements of the inner and outer zones. In spite of the fact that the concept of transition element is not so new and dates back to the last few decades but to the authors knowledge an obvious and clear programming strategy and the method of implementation in a FE program have not been depicted in particular in the related literature. In this study the main concept of transition element is completely presented with clear instances and the computational methodology of accounting for this subject is covered; then the programming strategy of the transition elements in a three-dimensional computer program of finite element method together with the related computer program parts in FORTRAN programming language are brought and finally a validating example is considered and the analogy between the results of the finite element program and analytical .anticipation is made

کلمات کلیدی:

Finite element method, Programming aspects, Transition elements, Validating example

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