

Modeling of Complex Structures: Shear Wall with Openings and Stiffened Shells

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Abstract : The analysis of complex structures encourages the engineer to make simplifying assumptions, sometimes attempting the analysis of the whole structure as complex as it is, and it can be done using the finite element method (FEM). In the modeling of complex structures by finite elements, various elements can be used: beam element, membrane element, solid element, plates and shells elements. These elements formulated according to the classical formulation and do not generally share the same nodal degrees of freedom, which complicates the development of a compatible model. The compatibility of the elements with each other is often a difficult problem for modeling complicated structure. This compatibility is necessary to ensure the convergence. To overcome this problem, we have proposed finite elements with a rotational degree of freedom. The study used is based on the strain approach formulation with 2D and 3D formulation with different degrees of freedom at each node. For the comparison and confrontation of results; the finite elements available in ABAQUS/Standard are used.

Keywords : compatibility requirement, complex structures, finite elements, modeling, strain approach

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