Super conforming mixed element in dynamic analysis

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Abstract

This paper presented a novel way to formulate the mixed element with independent displacement and drilling degree of freedoms, and constructed its dynamic schemes. The distributions of displacement in the triangular mixed elements are assumed in super conforming method. Super conforming displacement degree and drilling degree of freedoms were derived independently.

Novel triangular shell element SHELL-TSC was formulated based on the super conforming theory. Benchmark examples showed its high accuracy and high efficiency in dynamic analysis.

Super conforming theory is a novel view of conforming conditions between neighbor elements. Drilling degree of freedoms in shell elements is still a great challenge in developing structure analysis software. This paper revealed the basic theory of the super conforming element method.

Keywords: Computation mechanics, Finite element method, Dynamic analysis, Shell elements, Super conforming mixed element