

Study on the triangular shell elements for anisotropy material

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Abstract

This paper presents some novel ways to formulate the triangular shell elements for anisotropy material. According to different definitions of drilling degrees of freedom, distributions of displacement in the triangular shell elements are assumed in many views. Conforming displacements along sides of triangular shell elements are derived based on the assumption of drilling displacements.

Some triangular shell elements for anisotropy material are formulated on the principles of minimum potential and complementary energy. The benchmark examples showed their high accuracy and high efficiency.

Conforming conditions between different elements are discussed in some examples, especially the conforming drilling displacements between shell elements and beam elements. It was a great challenge in the development of the software for the structure analysis. This paper reveals the rule of the conforming conditions between two different elements.

Keywords: Computation, Finite element method, Conforming conditions, Shell elements