The 2023 World Congress on
Advances in Structural Engineering and Mechanics (ASEM23)
GECE, Seoul, Korea, August 16-18, 2023

Keynote Paper

Performance of the MITC3+ and MITC4+ shell elements

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ABSTRACT

The MITC (Mixed Interpolation of Tensorial Components) method has been widely adopted for analysis of general shell structures in most commercial finite element software since it was first proposed to alleviate transverse shear locking for a 4-node quadrilateral shell element, named as the MITC4 shell element. The shell finite elements based on the MITC method effectively alleviate various types of locking without using additional degrees of freedom, and the element formulations can be easily extended for nonlinear analyses. The formulation is also effective for triangular shell elements (MITC3 shell element). Recently, further development has been achieved, leading to the MITC4+ and MITC3+ shell finite elements. These improved elements provide more accurate solutions than the original MITC4 and MITC3 shell elements. In this presentation, we introduce the formulation of the MITC4+ and MITC3+ shell finite elements and show their detailed performance in various linear and nonlinear shell problems.

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