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Fundamental and applicative challenges in the modeling and computations of shells

We discuss the effectiveness and reliability of shell finite element procedures in relation to the asymptotic behaviors of shell structures when varying the thickness as a parameter. This is crucial in order to understand the complexity and diversity of shell physical behavior, and the difficulties to be confronted in the finite element analysis. In addition, we present some results and challenges directly related to applicative concerns and numerical practice, in particular as regards general shell elements and 3D-shell elements.