STABILITY CRITERION TO EXPLICIT FINITE DIFFERENCE APPLIED TO THE MINDLIN-TIMOSHENKO SYSTEM

Abstract. In this work, we show that the stability criterion of the explicit time integration method applied to the Mindlin-Timoshenko system is given by

$$\Delta t \leq \frac{\epsilon}{\sqrt{3}c_s},$$

where ϵ is the thickness of the plate and $c_s = \sqrt{\kappa G/\rho}$. This criterion imposes a restriction on the time step that makes the explicit method ineffective when the nodal spacing is large in comparison to plate thickness. This occurs in the case where $\epsilon \ll 1$, making its computational use impracticable. To minimize the influence of ϵ on stability criterion such that the CFL condition prevails, we use the techniques developed by Wright [1,2] which consists of combining the explicit time integration method with increasing rotatory inertia.

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