Numerical Modeling of Micropolar Plates and Shells

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Mathematical models of micropolar plates and shells taking into account independent small rotations of particles are considered. These models are the reduction of the three-dimensional Cosserat continuum equations to two-dimensional equations with linear approximation of displacements and rotations. The system of equations describing micropolar media is written in the form of thermodynamically self-consistent system of conservation laws. In this framework parallel numerical algorithms for the solution of dynamic problems are proposed.

Numerical algorithms are based on two-cyclic splitting method with respect to the spatial variables in combination with the explicit monotone finite-difference ENO-scheme. Parallelization is performed by the CUDA (Compute Unified Device Architecture) technology. The results of numerical modeling of wave propagation processes in micropolar thin plates and cylindrical shells under the action of distributed, concentrated, periodic and impulse loads are shown.

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