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**New formulation of the space-time finite element method for problems of evolution.** (English)

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Summary: The space-time finite element method was developed for problems of evolution. The equilibrium equations were determined in terms of velocity. Nonstationary partition into spatial finite elements, which arises from the evolution of the shape of material, was assumed. Properties of the solution scheme, particularly its convergence and stability, depend on the form of the distribution of virtual velocity. The system of one degree of freedom, described both by linear and nonlinear differential equation, was investigated. The damping of higher- mode oscillations and the amplitude and phase error were estimated. The solution of testing and real problems were performed. High efficiency of the proposed method for complex problems, also with internal contact, were proved.

**MSC:**

74S05 Finite element methods applied to problems in solid mechanics

74H45 Vibrations in dynamical problems in solid mechanics

**Keywords:**

convergence; stability; distribution of virtual velocity; damping of higher-mode oscillations; amplitude and phase error; internal contact