عنوان مقاله:

A General Boundary Element Formulation for The Analysis of Viscoelastic Problems

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خلاصه مقاله:

The analysis of viscoelastic materials is one of the most important subjects in engineering structures. Several works have been so far made for the integral equation methods to viscoelastic problems. From the basic assumptions of viscoelastic constitutive equations and weighted residual techniques, a simple but effective Boundary Element (BE) formulation is developed for the Kelvin viscoelastic solid models. This formulation needs only Kelvin's fundamental solution of isotropic elastostatics with material constants prescribed as explicit functions of time. It is able to solve the quasistatic problems with any load time-dependence and boundary conditions. A system of time-dependent equations is derived by imposing the convenient approximations and adopting the kinematical relations for strain rates. This approach avoids the use of relaxation functions and mathematical transformations. The main feature of the proposed formulation is the absence of domain discretizations, which simplifies the treatment of problems involving infinite domains. A computer code has been developed in the programming environment of MATLAB software. At the end of this paper, two numerical examples have been provided to validate this formulation.

کلمات کلیدی:

Viscoelastic Solids, Boundary Element Approach, Kelvin Solid Model

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