

Abstract

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Numerical estimation of dynamic behavior of viscoelastic elastomer specimen

Dynamic deformation behavior of a cylindrical specimen made of viscoelastic elastomers was investigated numerically by solving the two-dimensional elastic wave equations. In order to enhance the accuracy of the viscoelastic property calculations, a pseudospectral analysis of two-dimensional elastic wave equation was employed. This allowed us to exclude the use of the form factor derived from the conventional one-dimensional model. Using the present method, an assessment of the conventional form factor concept was attempted. The present two-dimensional method was then utilized to predict a forced vibration response of the elastomer samples under periodic excitation. Obtained numerical results were compared with those using the simplest one-dimensional model. Applicable range of the form factor was examined. Empirical formulas to correct static ν ; ν ; dynamic form factors for elastic deformation mode, which are suitable for engineering applications, are suggested.