SM25S_12632

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Application of Extended Phase Trajectories to Investigation of Forced Biharmonic Oscillations

Michael I. Kazakevitch, **Viktorija E. Volkova**

Dniepropetrovsk National University of Railway Transport, Dniepropetrovsk, Ukraine

The results of investigation of dynamic behaviour of mechanical systems which oscillations are described by a non-linear Duffing-type equation are presented in the paper. The outer periodic biharmonic excitation is applied to the mechanical system. The system state at each moment of time is defined by values of three phase co-ordinates. The sequence of points conforming to different system states forms phase trajectories in the extended phase space “displacement–velocity–acceleration”. Fundamentals of qualitative methods of dynamic systems investigation were developed by Poincaré. These methods have shown their efficiency in studies of autonomous oscillations of systems having one degree of freedom. The authors of this paper suggested application of projections of phase trajectories on a plane “displacement–acceleration” and “velocity–acceleration”. The application of these projections of phase trajectories allows to expand essentially the possibilities of qualitative methods of dynamic systems investigation. In particular, they can be used in procedures of structural identification.

View the extended summary