LINEAR AND NONLINEAR DYANAMICS OF HYBRID SYSTEM

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ABSTRACT. Discrete continuum method [1,2] for investigation of linear and nonlinear dynamics of hybrid systems containing coupled multi deformable bodies is presented. By use coupled rods, beams, strings, plates and membranes by discrete continuum mass less layers as well as layers with translator and rotator inertia properties into hybrid system series of hybrid system dynamics are investigated and phenomenological mappings in dynamics of these different real system is identifies. Expressions of generalized forces of subsystem interactions in hybrid system are presented by component mechanical energies and functions of energy dissipations. A model of dynamical dislocations with inertia properties in plate is presented. Transfer energy between subsystems. Constitutive relation of standard elements of discrete continuum coupling layers with translator and inertia properties, nonlinear elastic and fractional order properties are presented. Interaction between two coupled linear and nonlinear system, each with one degree of freedom as well as dynamics of discrete no homogeneous chain are considered in the light of mathematical analogy for obtaining eigen time functions of solutions of component deformable body displacements in hybrid system dynamics.

Also, lecture present series of the discrete system with hybrid dynamics in the form of coupled rotations and with ideal or no ideal constraints as well with vibro-impacts. Theorem of existence of trigger of coupled singularities in the phase portraits of the system with coupled rotations is presented.

Series of the original results of lecturer and doctorates supervised by lecturer will be listed.

Keywords: Hybrid system, hybrid dynamics, discrete continuum method, decomposition, subsystem interaction, multi-deformable body dynamics, *rods, beams, strings, plate, membrane,* eigen time functions*, generalized forced of subsystem interactions, energy transfer and interaction, trigger of coupled singularities, linearization, nonlinear approximation, phenomenological mappings.

References

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