

Qualitative methods in the investigation of some mathematical models of vibrations of one dimensional environments with considering nonlinear resistance forces

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In this talk we consider important classes of one dimensional environments, bending stiffness of which can be neglected. It is impossible to apply approximate analytical method of solution of mathematical models of dynamic processes. So justification of existence and uniqueness of solutions, carried out a qualitative their evaluation, based on numerical analysis are considering. Also the features of dynamic processes of some of examined class of systems are analyzed. Methods of qualitative study of oscillations for restricted and unrestricted bodies under the influence of the resistance forces, described in the talk are based on the general principles of the theory of nonlinear boundary value problems - Galerkin method and the method of monotonicity [1].

Scientific novelty consists in generalization these methods of studying for nonlinear problems at new classes of oscillating systems, justification of solution correctness for specified mathematical models that have practical application in real engineering vibration systems [2].

- [1] Pukach P. Ya., *Qualitative research methods of mathematical model of nonlinear vibrations of conveyor belt*, Journal of Mathematical Sciences, **198**, Issue 1, (2014), pp. 31-36.
- [2] Pukach P. Ya., Kuzio I. V., *Nonlinear transverse vibrations of semi-infinite cable with consideration paid to resistance*, Scientific Bulletin of National Mining University, **3**, (2013), pp. 82-86.