Dynamics of gear drive systems with impacts: ways leading to chaos
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This paper contains a brief overview of mathematical modelling and dynamic analysis of gear drives including gearing and bearing couplings with nonlinearities. The general mathematical model of nonlinear gear drive vibration is derived by modal synthesis method with degrees of freedom number reduction. The couplings nonlinearities, mainly the gear mesh interruption, affects the behaviour of the systems especially in resonant states and during low external applied torque. Chosen results gained on different test and real gear drives show the influence of coupling nonlinearities on complex gear drive behaviour with respect to chosen operation parameters.

Keywords: nonlinear dynamics, modal synthesis method, gear drive, gearing coupling, bearing coupling.