

## Modeling and experimental investigation of dynamics of two pendulums elastically coupled and driven by magnetic field

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*Abstract:* In this work both experimental and simulation results of a study of two physical pendulums coupled through an elastic torsional element are presented. Permanent magnets are attached to the pendulums ends and the system motion is forced by a variable magnetic field with a help of the exciting coils. The electric current signal possesses rectangular shape, and the experimental investigations have been carried out for different frequencies and amplitudes of the current signal (excitation). The derived mathematical model has been validated experimentally taking into account its experimentally confirmed parameters. The magnetic fields interactions have been reduced to the moment of a force based on the experimentally obtained data. A few of the dynamically different cases are studied including the elastically coupled/un-coupled pendulums and the system excitation carried out either by one or two pendulums. Regular and chaotic dynamics of this mechatronic system have been detected, illustrated and discussed.

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