Abstract

The changing of certain types of energy into other types in machines and mechanisms, the transformation of movement forms and carrying out certain working processes inevitably causes the emergence of variable forces and vibration-causing momentum. Vibration control and management are important tasks in aerospace field. This thesis solves the problem of the development of an effective control system based on the active method used for vibration reduction in a mechanical construction of a cantilever fixed metal plate broadband disturbance lab device. In the system synthesis process a carry out structural and parametric identification of the mathematical model of the controlled object using experimental data. LabVIEW 10.0 development environment and FPGA hardware technology from National Instruments were used to create a spectrum analyzer measurement system, which allows solving problems of experimental acquisition and identification of the dynamic properties of mechanical objects. With the help of MATHLAB environment mathematical apparatus and Optimization and Control System Toolbox packages, a mathematical model of the control object, regulators’ synthesis was built; their optimal parameters were searched for, and system operation with different
object structures and regulators (PID, LQG) was modeled.

References

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Index Terms

Computer Science
Control Systems

Keywords

Control system, regulator, PID, LQG, vibration, control object, mathematical model, LabVIEW,
MATHLAB.