An active disturbance rejection control approach to vibration control on flexible systems based on frequency response

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ABSTRACT ORIGINAL

Active disturbance rejection control (ADRC) is considerably applied due to its advantage of focusing on merely dominant parameters. Research on flexible systems frequently confronting perplexing disturbances can utilize this method to simplify irrelevant items as a single variable. In this paper, we focused on vibration control problems in flexible systems with the application of ADRC and constructed a second-order system model under the guideline of fundamental principles of ADRC and an innovative algorithm for tuning feedforward compensation ADRC. During the simulation, we discussed three cases in which each solely one parameter varies while others are kept invariant. Time, open-loop frequency, and close-loop frequency responses were respectively analyzed in all cases as to determine the stability of the system. According to the simulation results, we arrived at the conclusion: we should choose the specification of a flexible system within an intermediate range and evade from critical system parameters to procure stability and efficiency.