

Robustness evaluation of feedback control scheme for overhead crane

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ABSTRACT

This paper presents theoretical investigations into the dynamic characterization of a two dimensional gantry crane system. A dynamic model of the system is developed using Euler-Langrange formulation. Simulation exercises are performed in Matlab with three different control strategies; LQR, DFS and PD controllers and then the results are compared with uncontrolled system. To study the effects of initial sway angle on the response of the gantry crane system, the results are evaluated with varying initial sway angle in the algorithm. Simulation results are presented in time and frequency domains. Performance and robustness of the feedback controllers in minimizing the sway angle is examined in terms of time response specifications and magnitude of sway. Finally, a comparative assessment of different initial sway angle to the system performance and robustness is assessed and discussed.

KEYWORDS:

Sway angle reduction; robust feedback controller; gantry crane system; LQR controller; DFS controller; PD controller

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