Feedback control schemes for gantry crane system incorporating payload

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ABSTRACT
This paper presents theoretical investigations into the dynamic characterisation 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 payload weight on the response of the gantry crane system, the results are evaluated with different payload weight in the algorithm. Results achieved from simulation work are shown in time and frequency domains. Performance 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 payload weight to the system performance is assessed and discussed.

KEYWORDS:
gantry crane system; LQR controller; DFS controller; PD controller

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