**ABSTRACT**

Since several decades, gantry crane has played an important role in crucial processes in many industries. However, resulting payload’s sway imposes unwanted delays, inefficiency, and risk in a crane’s operation, therefore requiring an active controller in the system to minimize the sway of load. The precise control of crane payload sway is not a straightforward task due to the nonlinear, underactuated system, as well as external disturbances where the crane is operating such as wind gust and mechanical friction. In this internship, the crane system is derived by Lagrangian mechanics. Several control techniques in sway angle control are tested and compared in software simulation. A novel closed-loop feedback method is introduced and tested in simulation. It is shown that the proposed method are able to guarantee payload’s position in tracking a given reference trajectory despite wind disturbance. A test-bed model has also been designed with CAD drawing software for further studies. Motor, motion interface, and suitable sensors are incorporated to test-bed for future study. The feasibility of a closed-loop anti-sway control is studied and developed for outdoor crane implementation.

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