

Robust active heave compensated winch-driven overhead crane system for load transfer in marine operation

Abstract :

Active heave compensation (AHC) is important for load transfer in marine operation using the overhead crane system (OCS). The control of marine OCS aims to continuously regulate the displacement of the cart and the payload sway angle, whilst at the same time, maintaining the gap between the payload and the vessel main deck at a desirable and safe distance. As the marine OHC system is to be operated in a continuously changing environment, with plenty inevitable disturbances and undesirable loads, a robust controller, i.e., active force control (AFC) is thus greatly needed to promote accuracy and robustness features into the controllability of OCS in rough working environment. This paper highlights a novel method for controlling the payload in an OCS based on the combination of both AFC and AHC. Results from the simulation study clearly indicate that the performance of OCS can be greatly improved by the proposed robust AFC controller, as compared with the classical PID controller scheme.