

Robust output tracking of a 3DOF helicopter via high-order sliding mode observers

This paper tackles the output tracking problem of a MIMO system subjected to actuator faults and unmatched perturbations. The proposed methodology is based on high order sliding mode observation and identification techniques. A dynamic sliding surface is proposed using a nested-backward design strategy in order to counteract the effects of the unmatched perturbations. A super-twisting control is used to steer the state to the sliding surface. The identified value of the fault is injected to alleviate the control gain while accomplishing fault accommodation. As a consequence, the chattering is attenuated. A simulation example for a 3DOF helicopter highlights the efficiency of the present method.