

Modified guidance law based on a sliding mode controller for a missile guidance system

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Abstract:

In this paper, a modified guidance and control sliding mode controller (MGCSMC) method is proposed in a guided missile system. The modified sliding mode controller (MSMC) algorithm is adopted to enable the missile to reach the desired target within a short period of time. The target always makes high manoeuvres when the missile is close to it. This issue has been treated in guidance and control (G&C) by using a MSMC instead of the traditional method such as proportional navigation method (PN). Theoretical analysis is conducted to reduce the miss-distance and chattering phenomenon in SMC. Simulation of MGCSMC compared with PN method shows an improvement of about 80%, 47% and 20% for the chattering, miss-distance and finite time, respectively. Furthermore, for the high-altitude target, the MGCSMC improves the acceleration and flight angle of the missile by approximately 65%, and achieves 100% accuracy, whereas in PN method only 60% accuracy is achieved under the same conditions.