

THE MISSILE GUIDANCE ESTIMATION USING
EXTENDED KALMAN FILTER-UNKNOWN
INPUT-WITHOUT DIRECT FEEDTHROUGH
(EKF-UI-WDF) METHOD

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Abstract. This paper consider the estimation of the optimal missile guidance which the objective is to minimize the interception time and the energy expenditure. The proposed Extended Kalman Filter-Unknown Input-Without Direct Feedthrough (EKF-UI-WDF) approach is to estimate the optimal missile guidance and the target acceleration as unknown input to the missile-target interception model. Unknown input is any type of signals without prior information from a given state model or a measurement. The computational for the EKF-UI-WDF method and optimal missile guidance show the closest range to the missile-target is smaller than using the EKF. However the Mean Squared Error (MSE) of estimating the optimal missile guidance using EKF method is smaller than using EKF-UI-WDF method.

*Key words and Phrases:*EKF-UI-WDF, unknown input, optimal control, missile, target.