

ISAR Imaging and Tracking Algorithm for Maneuvering Non-ellipsoidal Extended Objects Using Jump Markov Systems

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Abstract : Maneuvering non-ellipsoidal extended object tracking (M-NEOT) using high-resolution inverse synthetic aperture radar (ISAR) observations is gaining momentum recently. This work presents a new robust implementation of the Jump Markov (JM) multi-Bernoulli (MB) filter for M-NEOT, where the M-NEOT's ISAR observations are characterized using a skewed (SK) non-symmetrically normal distribution. To cope with the possible abrupt change of kinematic state, extension, and observation distribution over an extended object when a target maneuvers, a multiple model technique is represented based on an MB-track-before-detect (TBD) filter supported by SK-sub-random matrix model (RMM) or sub-ellipses framework. Simulation results demonstrate this remarkable impact.

Keywords : maneuvering extended objects, ISAR, skewed normal distribution, sub-RMM, JM-MB-TBD filter

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