A Solution for Multiple Track Common Source Problems Due to Multipath Propagation

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Abstract—Over-the-Horizon Radar (OTHR) exploits the refraction of high frequency radiation through the ionosphere layers to detect targets beyond the line -of-sight horizon. Multipath propagation between the radar and the detected targets may result in multiple spatially separated tracks for a single target to be observed at the receiver site. Consequently there is a heavy traffic, especially in case of multiple targets, to be associated and combined if there are tracks representing the same target. In this paper, a new method for multipath clustering for OTHR is proposed. The proposed method describes the similarities between all tracks as fuzzy degrees of membership. This method can operate in real-time and can perform clustering and fusion of OTHR tracks with tracks from other sources such as targets reporting global positioning systems and microwave radars. The proposed method has the advantages of less computations and high efficiency compared to conventional fuzzy logic clustering techniques. It has also the advantage of treating all the tracks data at once rather than pairwise. The efficiency of the proposed method is demonstrated using simulated examples.[12]