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Title: Feature-based Detection Methods for Floating Targets on the Sea Surface

Abstract: Radar target detection in sea clutter is of significance to both civilian and military. With the miniaturization and invisibility of sea targets, floating small targets with slow speed have become the focus of radar detection. However, the detection of floating small targets in the background of sea clutter has always been a problem. Floating small targets usually have a weak Radar Cross Section (RCS) and slow speed, making it difficult to detect such targets in sea clutter. Traditional target detection methods exhibit poor performance in the detection of floating small targets. For the detection of small and weak targets on the sea surface, a high-Doppler-resolution and high-range-resolution system (double high system) is an effective way to solve this problem. In the double high system, the target echo received by the radar provides readily available and sufficient information. However, how to transform and refine this information to improve detection performance has always been a challenge to the radar industry and a subject of constant innovation. In recent years, under the double high system, as an artificial feature engineering stage for intelligent radar target detection, scholars have proposed a variety of feature-based target detection methods to alleviate the difficulty in detecting floating small targets when relying only on energy information and considerably improve detection performance. To ensure that relevant radar practitioners better understand the development and future trend of this field in recent years, this report summarizes the difficulties of sea target detection and common target detection methods, analyzes the principle and general framework of feature detection and several typical feature-based detection methods, and explores the development trend of feature-based detection methods.

Key words: Sea clutter; Floating small targets; Radar target detection; Features extraction; Feature-based detection

