Composite Gaussian Pulsed Waveform For Robust Resonance Radar Signature

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Abstract

The paper assesses the feasibility of forming a composite excitation pulse with a high potential to combat the noise and onset ambiguity when estimating the target resonance behaviour in a radar target signal. The assessment investigates four composite pulse configurations of unified or adaptive setups for the fractional bandwidth and peak weight to find the best setup in enhancing the resonance signature robustness. The assessment uses the method pencil function to extract the resonance parameters of the composite time data (coherent) and then determine the degree of robustness over-extraction onset and range of noise level. Determining the robustness rate requires finding the error between the original excitation frequencies and the extractable resonant frequencies and, second, the similarity between the original and reconstructed pulse waveforms. The qualitative assessments of the robustness merit concluded that the adaptive configuration of peak weight and small adaptive fractional bandwidth outperforms the other configurations in enhancing the resonance signature robustness.

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