Radar Pulse repetition interval estimation based on Blind Source Separation

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***Abstract*—To address the challenge of radar signal aliasing in complex electromagnetic environments, this study proposes a PRI estimation method based on signal separation preprocessing. Mixed signals from a one-dimensional uniform antenna array are separated using blind source separation, isolating single radar signal pulse flows. This paper proposes an innovative waveform shaping method based on the floating threshold of Hilbert envelope, which is then applied to obtain rectangular pulses, enabling precise estimation of pulse arrival and end times. This leads to accurate PRI calculation. Simulation experiments validate the method's effectiveness, providing a solid foundation for PRI modulation recognition, radar mode analysis, and threat assessment.**

***Keyword*—radar signal aliasing; pulse repetition interval; signal separation preprocessing; waveform shaping**

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