Abstract

Multiple input multiple output radars transmit partially coherent or noncoherent waveforms for improving spatial resolution or spatial diversity. While waveform design for SIMO radars concentrate on improving the delay and Doppler resolution characteristics, waveform design for MIMO radars involve optimization of delay, Doppler and spatial resolution characteristics. The resolution properties of MIMO radar transmit waveforms is studied using the MIMO radar ambiguity function. MIMO radar ambiguity function of frequency hopping waveforms is recently derived. Considering the many advantages of phase coded pulse waveforms in radar applications, this paper derives the MIMO radar ambiguity function of phased coded pulse waveforms. Further, a numerical optimization algorithm based on simulated annealing is proposed for designing parameters of the phase coded pulse waveforms that minimize the peak of the ambiguity function at all mismatched values of delay, Doppler and angular dimensions.
Index Terms

Computer Science

Wireless Communications

Keywords

MIMO radar ambiguity function pulse coded waveforms spatial resolution