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ARTA PROCESS MODEL OF MARITIME CLUTTER AND TARGETS

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Abstract

A coherent autoregressive–to–anything (ARTA) stationary stochastic process for modelling maritime clutter and targets is presented in this paper. The ARTA stochastic process model is an improvement over previous models in the sense that it is complex–valued, has a magnitude with an arbitrary, nonnegative distribution and an arbitrary autocorrelation function. A rapidly converging algorithm for finding appropriate filter coefficients to realize a specified autocorrelation function is presented. The validity and practicality of the ARTA process model is demonstrated by deriving models for a maritime target and for sea clutter, both from measurements and without any prior assumption regarding the distribution of measurements. This ability to generate additional data samples with the same statistics as a set of measurements is a prerequisite for the verification of system specifications in situations where only a few data measurements are available for each mode of operation and / or environmental condition.