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Detection and Countermeasures » Radar Countermeasures

Statistics of Electromagnetic Scattering from Chaff Clouds

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Abstract: Starting from first principles, the first and second order probability densities of the scattered field from **chaff** clouds are derived. Auto-correlation functions and power spectra of the received voltage, radar cross section and phase are obtained. All the mathematical derivations are explained in full detail. For the simple case of a spherically uniform distribution of relative speed of the dipoles, it is shown that an integral relation exists between the speed distribution function and the intensity auto- correlation function. The utility of second order statistics in studying the effects of **chaff** clutter fluctuations on advanced radars such as moving target indicator is demonstrated. Finally, numerical results are included both from an actual experiment and calculations based on assumed dipole velocities. Although it was not possible to compare the two unrelated events, there were definite trends of similarity in the data.

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