

Comparison of Square Law, Linear and Bessel Detectors for CA and OS CFAR Algorithms

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Abstract—A major challenge in radar detection is to optimize both the detection performance and computation cost. In Constant False Alarm Rate (CFAR) algorithms, different detectors can be implemented like linear, square law or Bessel detectors. These detectors have difference detection performances and computational costs. In this paper, the detection performances of these three detectors are investigated for CA-CFAR and Order Statistic CFAR (OS-CFAR) algorithms using simulated and measured data of semi-urban desert terrain. Monte Carlo simulation was used to compute the performance in both Gaussian noise and Weibull interference. Results obtained using both simulated and measured data show that the square law detector offers superior performance to the linear and Bessel detector for the OS-CFAR algorithm. In the case of the CA-CFAR algorithm, the square law detector offers the best performance for large values of the Weibull shape parameter. When the Weibull shape parameter is small, the linear detector offers the best performance.