Abstract

The ability to reduce noise in a received radar signal from its target largely indicates the accuracy of the radar system. Matched filters help to maximize the signal to noise ratio of radar systems. Matched Filters are commonly used in radars whose transmitted signals are known and are used as a replica to correlate with the received signal. The correlation is carried out in frequency domain applying Fourier Transforms. A Singular Value Decomposition (SVD) matrix filter is presented in place of the commonly used matched filter with the aim of leveraging the compression capability of the SVD algorithm as used in data compression. In this research, an FFT matched filter and an SVD matrix filter are simulated with an input chirp signal designed with LabVIEW. The results are compared based on their compression ratio, range resolution and signal to noise ratio. The SVD Matrix Filter from the simulation demonstrated a comparative improvement in compression ratio, range resolution, and signal to noise ratio over the Matched filter using the same parameters.

Index Terms
Computer Science  Signal Processing
Keywords

Singular value decomposition, radar signals, signal-to-noise ratio, signal compression, radar.