

Abstract

• Understand how phase noise influences the quality of radar estimates and the performance of ground clutter filters.

Phase Noise Model

Phase noise can be modeled by a real, zero-mean, Gaussian random variable added to the phase of each received complex voltage. The standard deviation of this random variable, ϕ_{rms} , is related to the phase noise by $20\log_{10}(\phi_{rms})$, where $\phi_{\rm rms}$ is in radians.

Phase Noise Influence on Spectrum

In the presence of strong signals, phase noise can increase the effective noise floor of the system.



Phase Noise Influence on Clutter Suppression

Increased phase noise decreases the effective clutter suppression of the system.



January 2016 – 32nd Conference on Environmental Information Processing Technologies – New Orleans, LA

Assessing Phase Noise Effects on Weather-Radar Data Quality

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Reflectivity

Velocity

Spectrum Width

Differential Reflectivity



Differential Phase





