PRINCIPLE AND EVALUATION OF A REGISTRATION-BASED RANGE-DEPENDENCE COMPENSATION METHOD FOR STAP IN CASE OF ARBITRARY ANTENNA PATTERNS AND SIMULATED SNAPSHOTS

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PROBLEM:

- ESTIMATION OF CLUTTER COVARIANCE MATRIX
  - ! RANGE DEPENDENCE OF BISTATIC CLUTTER
Range-Dependence Compensation Principle

- Clutter spectrum
- 2D spectrum locus
  - R=250km
  - Compensation: sum along the 3D spectrum locus
  - Parameters of this surface?

3D spectrum locus

- R=180km

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Parameter Estimation Method
Principle in 2D

Fit mathematical model of clutter power spectrum (PS) locus to clutter PS

Snapshots → Spectral Estimation → Peak Extraction → Threshold → Model fitting

Model parameters

\( \theta \)

Fit mathematical model of clutter power spectrum (PS) locus to clutter PS
Parameter Estimation Method
Generalization to 3D

Peaks:
+ High amplitude
+ Low amplitude

Power spectrum (PS)

Clutter PS locus

Extract
Fit

Stack
Results: Omnidirectional Antennas

Extracted peaks

3D model fit

Estimation error

True covariance matrix

Slice

SinR loss (dB)

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Results: Directional Antennas

Extracted peaks

3D model fit

Estimation error

True covariance matrix

SINR loss (dB)

but no signal...

Estimation Errors...

Slice

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