

MIMO Circular SAR: Waveform Design to Mitigate ECM

Uttam K. Majumder
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Instructor: Professor Mark Bell

1. INTRODUCTION

This paper examines waveform design for a MIMO Circular Synthetic Aperture Radar (CSAR) system. In particular, the paper will be focused on designing a waveform that can be used both in friendly or hostile environment effectively. In many SAR systems, Linear Frequency Modulation (LFM) waveform are used. However, performance of a SAR system has not been studied if the transmitted signal waveform is distorted by barrage noise. Hence, our goal is developing a "Jamming – tolerant" waveform so that functionality of a SAR system (i.e. Video SAR, GMTT) could be preserved.

2. DESCRIPTION

Literature search. Not many papers available on this topic. I found 1 paper (China). Soumekh mentioned two books; one by W. Goj (SAR and Electronic Warfare) and the other by J. Proakis (Digital Communications). May be due to Govt. use, not many discussions available online. Regardless, MIMO will be effective if it can provide ECCM capability for ISR mission. Future possible applications: SBR, MDA etc.

3. LFM WAVEFORM

I have developed code for LFM that shows TFACF/AF. Next step, put the Phase coding.

4. CONTINUOUS PHASE MODULATION

Implement different phase coding

5. DATA GENERATION

Generate an environment with Barrage noise; collect data applying general waveform and the Jam-tolerant waveform. Image the scene.

6. RESULTS AND ANALYSIS

Describe the performance (detectability) of the point targets in the presence of Barrage noise with two different kinds of waveform.

7. CONCLUSION