Overview

This repository contains the simulation codes used in the paper "Unimodular Beampattern Shaping in 4D-Imaging MIMO Radars". It includes comparative spectral results, necessary functions for optimization and objective functions, and the main script to reproduce the results presented in the paper.

Contents

Comparison Data Folder

In the `comparison_data` folder, you will find the spectral results from the following studies:

- M. Deng, Z. Cheng, and Z. He, "Spectrally Compatible Waveform Design for Large-Scale MIMO Radar Beampattern Synthesis With One-Bit DACs," in IEEE Transactions on Aerospace and Electronic Systems, vol. 58, no. 5, pp. 4729-4744, Oct. 2022, doi: 10.1109/TAES.2022.3165766.
- M. Alaee-Kerahroodi, E. Raei, S. Kumar, and B. S. M. R. R., "Cognitive Radar Waveform Design and Prototype for Coexistence With Communications," in IEEE Sensors Journal, vol. 22, no. 10, pp. 9787-9802, 15 May 2022, doi: 10.1109/JSEN.2022.3163548.

Main Functions Folder

The `main_functions` folder contains all the necessary functions for performing the optimization processes (GA, PSO, SA, and CMAES) as well as the objective functions (Spatial and Spectral).

Result Folder

The core of our simulation, `Results.m`, is located in the `result` folder. Running this script will reproduce the exact results discussed in our paper. The figures generated by this script are saved in the `figs` subfolder within the `results` folder for easy access.

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How to Use

1. Navigate to the `result` folder.
2. Run the `Results.m` script in MATLAB.
3. Access generated figures in the `figs` folder within `results`.

Thank you for your interest in our research. For any queries or further assistance, please contact the authors.