Optics and Radar based Observations F7003R, 7.5 ECTS

V. Barabash

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**Assignment 3**

**Optimization of phased array antenna radiation pattern and array configuration**

Assignment shall be done in a group of 2 people. Each group shall submit one report.

**Task:**

Configure a phased array consisting of 64 lined up individual isotropic antennas with the composite main antenna beam into vertical direction. Design a Matlab code basing on the governing equation (1) (J. Röttger, The Instrumental Principles of MST Radars, Ch. 2.1) and investigate how the radiation pattern changes if the following parameters are modified:

* ratio between wavelength and distance between individual elements;
* distance between individual elements (space weighting);
* zenith angle (aspect sensitivity);
* number of antenna elements.

Try to find the optimal design for the antenna array. Discuss possibilities for implementation of electrical weighting.

(1)

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**Report:**

The structure of the report should be:

* Title page
* Introduction to the problem. References should be given in the text.
* Data analysis and discussion.
* Implemented Matlab codes.
* List of references. Web pages are permitted.
* Confirmation that you have participated in the current work.

The length of the report (excluding the title page, Matlab codes and confirmation) should not exceed 8 pages. Please note that using “copy-paste” techniques will result in report rejection. Plagiarism will be reported to LTUs lawyer according to the Swedish national legislation.