

Thesis Topic

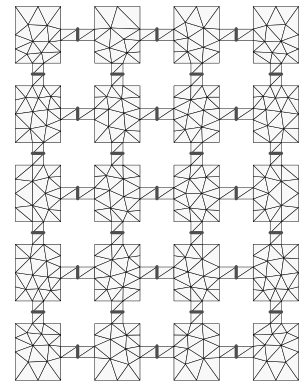
The CEM team offers the following topic

“Reconfigurability of Smart Electromagnetic Structures”

to be chosen by a student and elaborated as the final thesis.

DESCRIPTION

Examine reconfigurable devices such as steering arrays, pixel antennas, or programmable wave computers. Determine the number of states achievable in a given design area with a specific material. For example, analyze the range of radiation patterns possible using a structure with electromechanical switches. Develop a metric to assess the quality of these states. Employ tools such as integral equations, optimization algorithms, and statistics for analysis.



CONTEXT

The topic will be solved within the prestigious Junior Start project of the Czech Science Foundation. Collaboration with the members of the CEM group is expected.

PREREQUISITIES

Knowledge of programming, algebra, and basic knowledge of electromagnetism is expected.


REWARD

There is a monthly financial reward of ~8.000 CZK (before tax) associated with the topic elaboration.

LITERATURE

- [1] Jiang, *et al.*: Pixel Antenna Optimization Based on Perturbation Sensitivity Analysis, *IEEE Trans. AP*, vol. 70, pp. 472–486, 2022.
- [2] Costantine, *et al.*: Complexity Versus Reliability in Arrays of Reconfigurable Antennas, *IEEE Trans. AP*, vol. 60, pp. 5436–5441, 2012.

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Surface current density on two plates, $ka = 0.5$.
The 1st mode of $\mathbf{X}_0 \mathbf{I}_n = \lambda_n \mathbf{R}_0 \mathbf{I}_n$ decomposition is depicted.