Thesis Topic

Computational Electromagnetics Group
Department of Electromagnetic Field
Faculty of Electrical Engineering

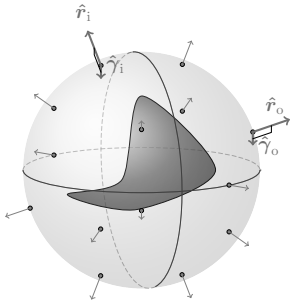
The CEM team offers the following topic

"Modal Decomposition in FEKO Using Arbitrary Full-Wave Solver"

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

DESCRIPTION

The characteristic mode decomposition is a popular tool in antenna analysis and design. However, its applicability is restricted to the method-of-moments solver. To overcome this limitation, explore a recent approach based on the decomposition of scattering dyadic matrix, which can be constructed in an arbitrary full-wave solver. To implement this approach, use the electromagnetic simulator Altair FEKO and the in-house codes of the CEM group, which provide the necessary functionality. The resulting code should remotely interact with FEKO and strive for a generalized implementation of the characteristic mode decomposition.



CONTEXT

The topic will be solved within the collaboration with Altair FEKO and Amazon USA. Collaboration with the members of the CEM group is expected.

PREREQUISITIES

Knowledge of programming 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] Capek, *et al.*: Characteristic Mode Decomposition Using the Scattering Dyadic in Arbitrary Full-Wave Solvers, *IEEE Trans. AP*, vol. 71, pp. 830-839, 2023.

[2] Altair FEKO, 2023, Altair Engineering Inc.

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Visit the web page of our team at cem.elmag.org.

Surface current density on two plates, $ka = 0.5$.
The 7th mode of $\mathbf{X}_0\mathbf{I}_n = \lambda_n\mathbf{R}_0\mathbf{I}_n$ decomposition is depicted.