# Model order reduction for electromagnetic source problems

TECHNISCHE UNIVERSITÄT DARMSTADT

**Proposal for a master's thesis or a seminar topic**
**Study field: Computational Engineering | Computer Science | Electrical Engineering | Mathematics**
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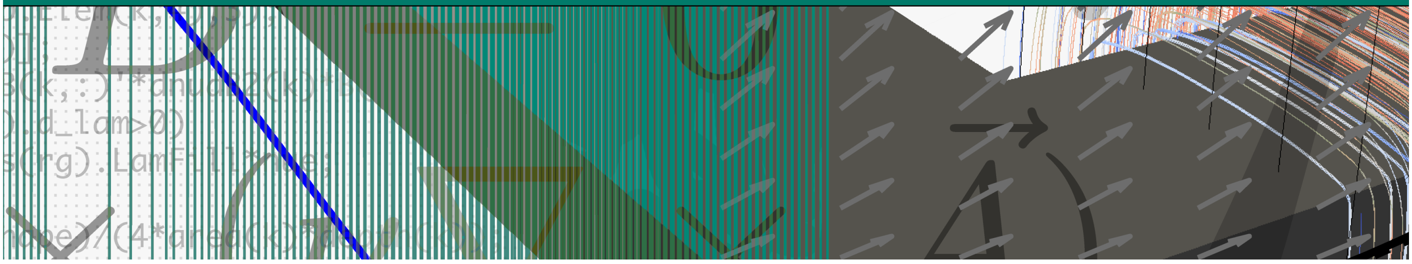

## Description

Computing discrete solutions to electromagnetic problems in industrial applications generally remains computationally expensive for 3D models. This is especially true for eddy current and magnetostatic problems. It is often necessary to defeature the model which has the drawback that it is difficult to quantify the error w.r.t. the full model.

Instead of defeaturing, we want to investigate model order reduction (MOR) techniques based on available simulation results or measurements. These are used in methods such as Proper Orthogonal Decomposition (POD, [1]) and Dynamic Mode Decomposition (DMD, [2]) to extract characterizing field components and speed up computations while controlling the error of the reduced model. Possible applications include the simulation of electric machines or planar coils, e.g., see Fig. 1.

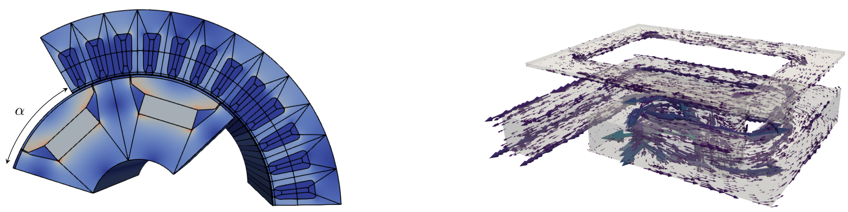


Figure 1: Application examples for MOR.

## Prerequisites

Interest in and experience with numerical methods for PDEs, some Matlab skills.

## References


[1] Julien Weiss, A Tutorial on the Proper Orthogonal Decomposition, DOI: 10.14279/depositonce-8512

[2] Peter J. Schmid, Dynamic Mode Decomposition and Its Variants, DOI: 10.1146/annurev-fluid-030121-015835



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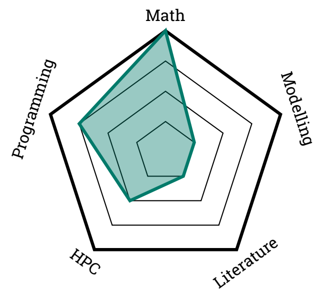
**Weighted Core Areas:**

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