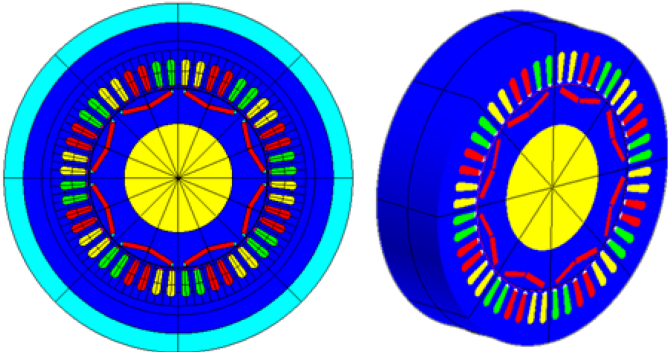# PMSM efficiency map with FeMT: 2D-3D comparison

3D Application Note Summary

This study proposed the comparison of the efficiency map of the same synchronous machine from two different models: a 2D and a 3D one. Flux E-Machine Toolbox (FeMT) will be used to obtain both efficiency maps.

| Applications	Flux main functions	Post-processed quantities
• Transient magnetic • Flux e-Machine Toolbox	• Losses • Efficiency Map • Flux e-Machine Toolbox	• Efficiency Map • Current and voltage map • Losses maps • Control angle map • Power map

Studied device
The studied device is a brushless AC embedded permanent magnet motor. Also analyzed in the supervisor examples brushless IPM motor (embedded magnets) (2D and 3D). The figure opposite shows the aforementioned models.

In practice

- The FeMT projects included are already solved. A new resolution could take long execution time. Distributed calculus is highly recommended.
- FeMT execution time (2D example): around 4 h [64 bit - 192 GB RAM - 3.4 GHz and 24 processors working in parallel]
- FeMT execution time (3D example): around 133 h [64 bit - 192 GB RAM - 3.4 GHz and 24 processors working in parallel]

Example 1: From the 2D project

FeMT application will be launched from the 2D project. A project already processed is proposed in FeMT in order to analyze the results avoiding the long computation time.
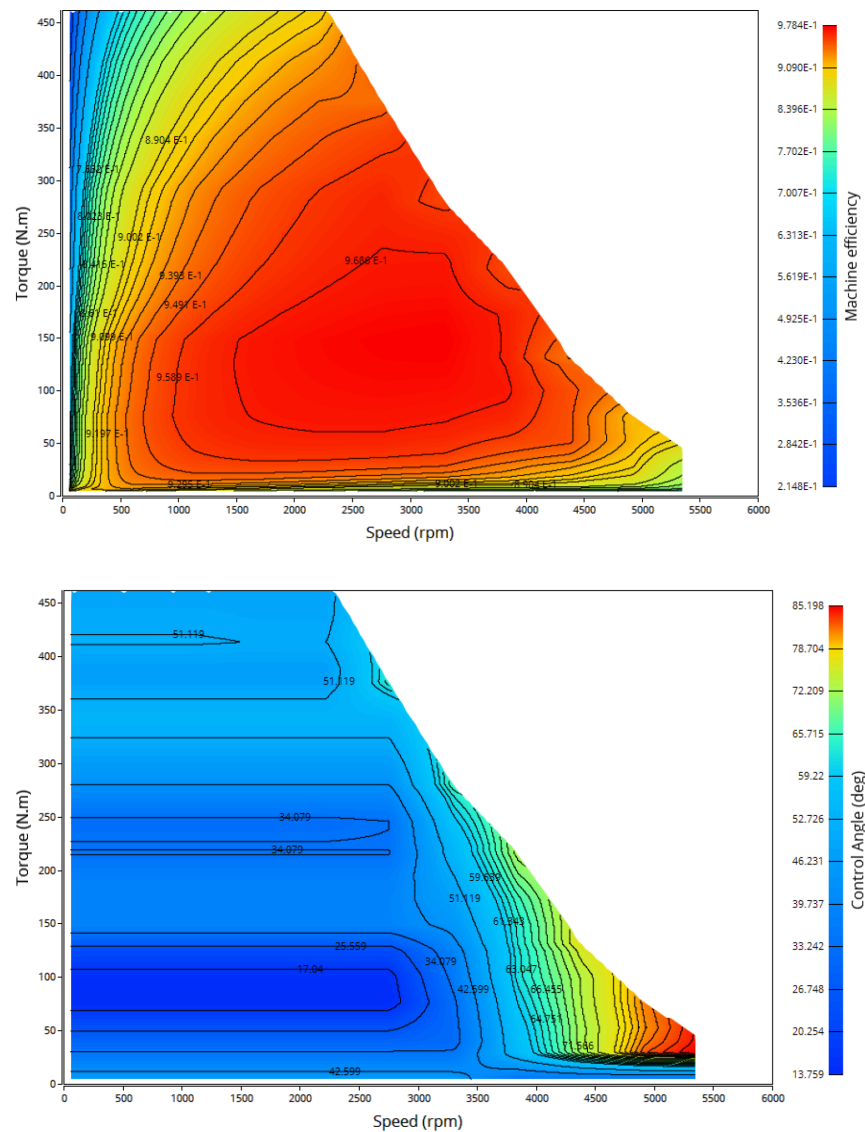
Example 2: From the 3D project

FeMT application will be launched from the 3D project. A project already processed is proposed in FeMT in order to analyze the results avoiding the long computation time.

A comparative between 2D and 3D results is also proposed in order to study the main differences and their reasons.

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