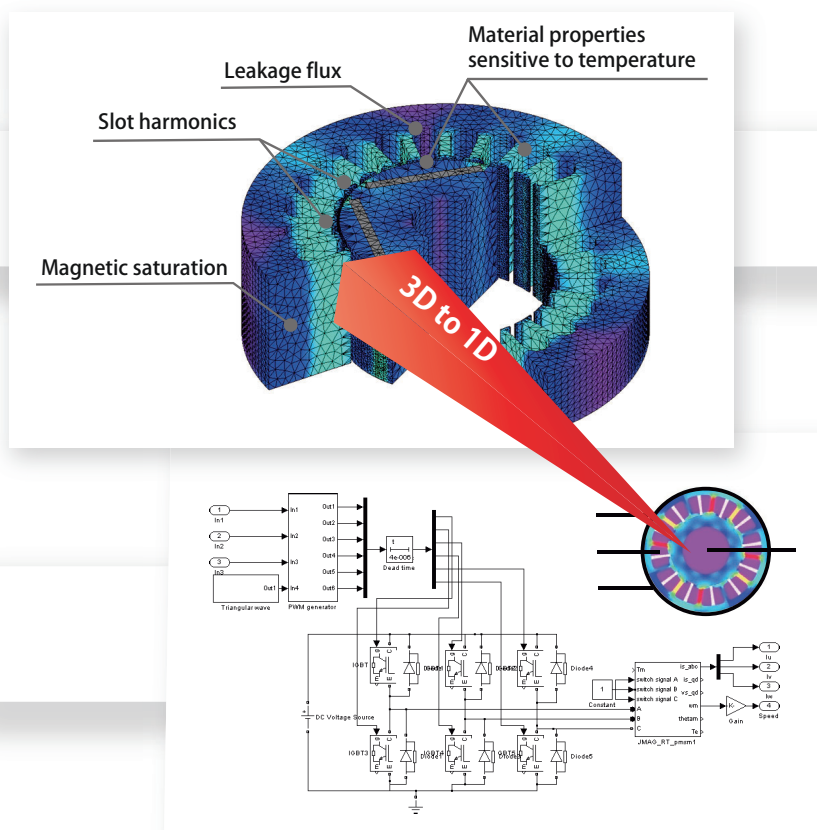


JMAG's Proposed Model Based Development

JMAG-RT enables model based development with high concurrency, allowing plant design and control design to be performed concurrently. JMAG-RT is a system which generates high-fidelity plant models (JMAG-RT models) in a system level simulation from FEA models. From system design, to ECU verification using HILS, JMAG-RT has a wide range of uses.

Features

- Using a virtual device model in HILS means that it is possible to test the ECU while the device is still under construction. This can reduce the amount of test time necessary on the actual test bench.
- Conceal information about geometries or materials so it can be shared between business companies. Furthermore, password protection can be enabled, allowing for secure transactions.
- The JMAG-RT model captures device performance that includes non-linear effects, saturation, and space harmonics. This high fidelity model's response is nearly identical to the actual device's response.
- FEM-Parameterized PMSM Block Support: Use JMAG-RT models with Simulink and Simscape.



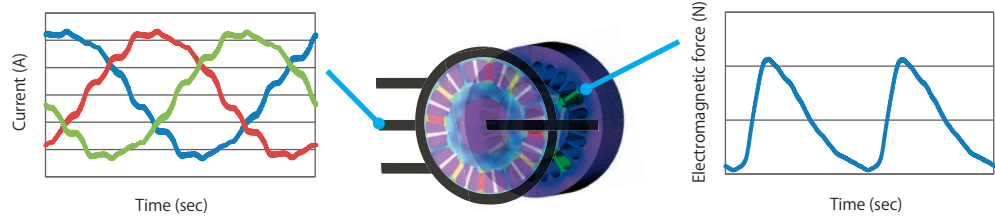
JMAG User Conference Presentations

- Daihatsu Motor Co., Ltd., "Establishing Thermal Analysis Method for Motors by coupling JMAG x Amesim", JMAG Users Conference 2023
- Subaru Corporation, "Applied Cases of EV Motor Controller Tuning by MILS using JMAG-RT", JMAG Users Conference 2023
- Toyota Motor Corporation, "Example of Using JMAG-RT for High-Voltage Systems in the Toyota Hybrid System Application to Verification of Feasibility Before Actual Machine Test", JMAG Users Conference 2022
- Aisin Corporation, "Case Study for Motor Control System Development with Redundancy using Model-Based Development (MBD)", JMAG Users Conference 2022

Monitor Physical Quantities Inside a Motor

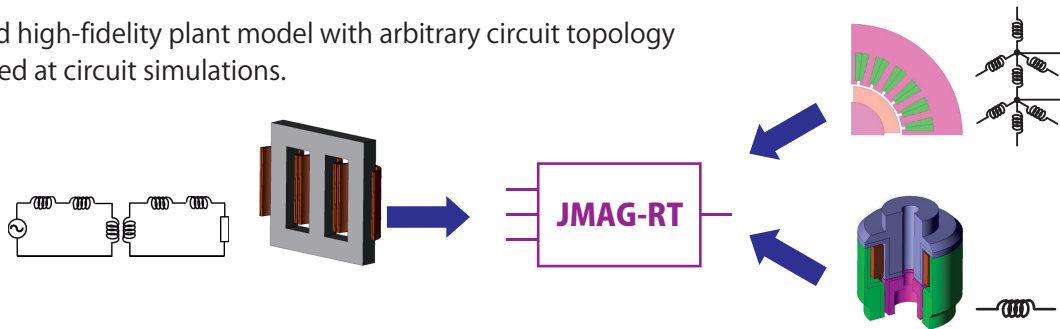
When performing a simulation of control system, magnetic flux density and electromagnetic force can be monitored in real time in motors.

This is useful when evaluating control methods for NVH or improving magnetic circuit designs.



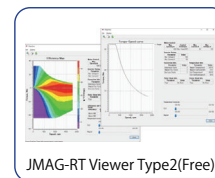
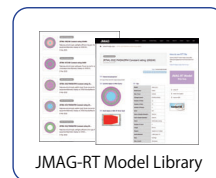
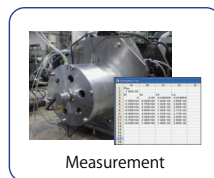
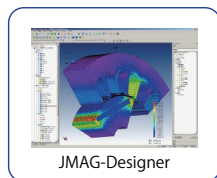
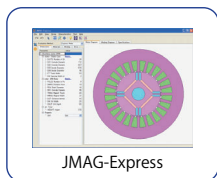
Support for Arbitrary Models

FEA-based high-fidelity plant model with arbitrary circuit topology can be used at circuit simulations.



How to Create JMAG-RT Models

- JMAG's finite element method (FEM) analysis allows the model creation even without an actual machine.
- Also possible from actual measurement values of the motor.
- Plant models can also be obtained from the JMAG-RT motor model library.
- JMAG-RT Viewer can even create and display inductance and other characteristic maps.



Supported Systems

JMAG-RT is applicable to major SILS, MILS and HILS systems which are used for system-level and real-time simulations.

- MILS/SILS - Amesim - GT-SUITE - LabVIEW/VeriStand - MapleSim - MATLAB/Simulink - PSIM - RecurDyn - SaberRD - Scideam - SIMBA - SimulationX
- HILS - A&D - Concurrent RT - DENSO TEN - dSPACE - DSP Technology - OPAL-RT - Speedgoat - Typhoon HIL

Supported Devices

- Permanent magnet synchronous motors (3-phase, 6-phase)
- Induction motors (3-phase, 6-phase)
- Stepping motor (2-phase)
- Switched reluctance motors (3-5 phase)
- Linear solenoid
- Permanent magnet linear motors (3-phase)
- Wound-Field Synchronous Motor
- Synchronous reluctance motor (3-phase, 6-phase)
- Generic model

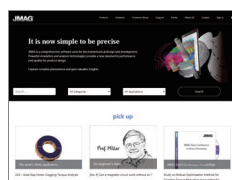
Connection Types

- Star connections
- Delta connections
- Open windings

*The names of the products and services are the trademarks or registered trademarks of the copyright holder.

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