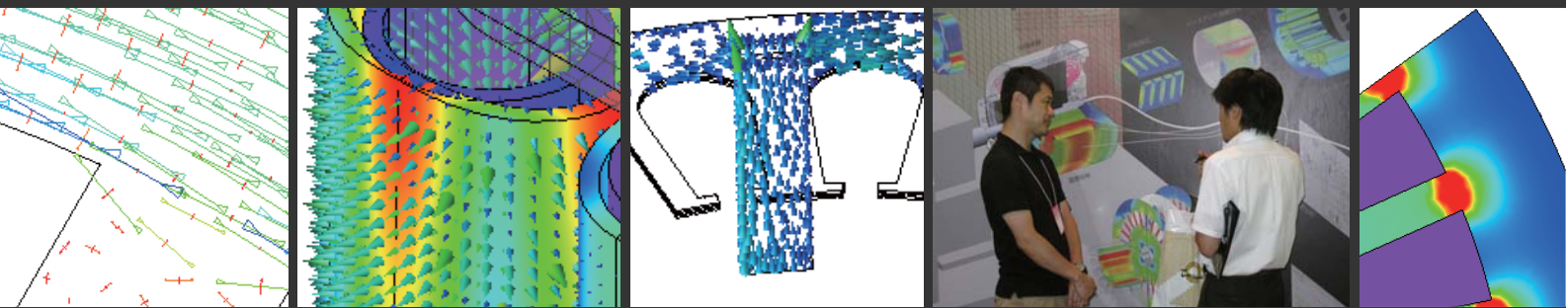


# JMAG Newsletter



September, 2014

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# JMAG Newsletter: Highlights of the September Issue

Recently, autumn breezes have swept in, putting an end to muggy Japan summer nights. We hope your seasons are comfortably changing as well. We are pleased to present you with the August issue of the JMAG Newsletter.

To go along with what we introduced in the "Solution" multiphysics seminar held on July 31st, we would like to present some usage examples.

"Event Information" contains JMAG-Express workshops to be held this August, as well as a JMAG-RT seminar for MBD. We hope that those of you involved in motor design, and developing model bases will join. We look forward to seeing you there.

The JMAG Newsletter is intended for everybody, from those who are currently using the product to those who have not started yet. So please feel free to pass this newsletter on to new users as well.

We hope you enjoy this information-packed issue and find something of value on each page.

JSOL Corporation

## Solutions

# JMAG Multiphysics Analysis

In response to advancements in analysis for electromechanical design, JMAG has been working on function development of thermal analysis and structural analysis on top of magnetic field analysis, as well as multiphysics analysis combining these analyses over the past 10 years. To execute coupling analysis with other CAE software, we have been focusing on the development of the multipurpose file export tool, as well as coupling analysis with STAR-CCM+ and Abaqus. This article will report the details on the "Solution Seminar of Structural, CFD, Electromagnetic Field Coupling for Electromechanical Design" event on July 31.

## Introduction

Since 1995, JMAG has been working on function development of thermal and structural analyses, and multiphysics analysis combining thermal and structural analyses. In addition, we have been working on increasing the accuracy for loss that will become the heat source, electromagnetic force that will become the vibratory source, as well as magnetostrictive force and the material model. In 2010, JMAG has implemented the coupled analysis with Abaqus, the structural non-linear analysis software. This year, in 2014, we have also established a partnership contract with CD-adapco, which is the developer of CFD analysis software, STAR-CCM+, for coupling analysis with JMAG.

In July 31, 2014, we held a seminar by the name, "Solution Seminar of Structural, CFD, Electromagnetic Field Coupling for Electromechanical Design" and introduced the functionality of coupling electromagnetic field with structural, electromagnetic field with thermal fluid, and 3<sup>rd</sup> party coupling as well as case studies using them. We will introduce details in this article.

## Multiphysics Analysis for Electromechanical Design Today

The demand for compact rotating machines are getting higher by the day. As for HV motors, with the influence of high voltage and acceleration, the power density has drastically increased. These harsh demands are met and realized with technological innovations in design such as magnetic design, insulation technology, cooling technology and mechanical design technology. It can be said that the root of technological innovations comes from multiphysics analysis.

There are 3 main types in multiphysics analysis. The first is to evaluate large-scale machines for multipurpose, which are difficult to make prototypes. Electromagnetic field, thermal, CFD, structural analyses are all applied separately for this. The second is when running thermal coupling analysis accounting for heat source as loss distribution to evaluate cooling problem due to size reduction. Lastly, for the purpose of limit design, when there are mutual interactions between magnetic, thermal, and structural, and when running a Co-Simulation accounting for each factor in both.

## Issues of Multiphysics Analysis Unique to Electrical Equipment

There are several issues that need to be solved

when applying multiphysics analysis combining electromagnetic field, thermal, CFD, structural analyses to electric devices. It can be said that initiatives for multiphysics are equal to initiatives for solving this issue. For example, one of the themes is to obtain material data with temperature dependency and stress dependency. With the help of material makers, we have been able to maintain material data but this is themes that require our continued commitment (Fig.1).

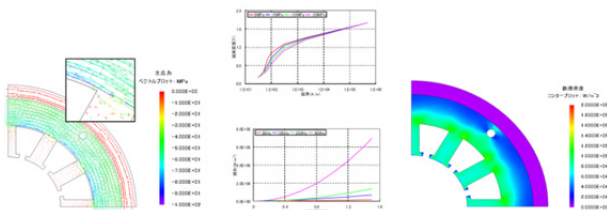


Fig.1: Iron loss analysis accounting for stress distribution

Next is mapping physical amounts. This includes data transfer from 2D models to 3D models, full modelling, data enlargement when running nodal force mapping including inside the object, mesh problems unique to magnetic field analysis such as skin effect.

To counteract issues related to mapping nodal force, we took measures such as controlling the mapping target region and converting to generalized force. We took measures for different dimensions as well as for models (Fig.2).

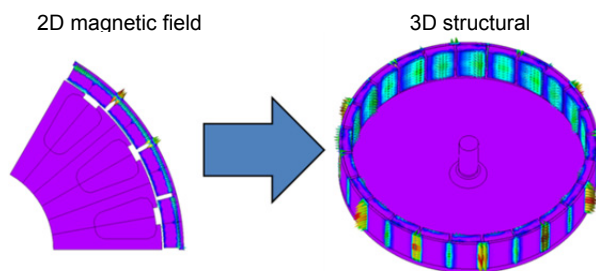


Fig. 2: Mapping 2D part models (magnetic fields analysis) to 3D full models (structural analysis)

Lastly, support for different time scales should be noted. Electromagnetic phenomena and thermal phenomena generally differ greatly in time constant, and when running coupling 1 step by 1 step, analysis time takes too long. For that reason, we have been developing analysis combining frequency magnetic field analysis and transient thermal analysis, as well as a subcycling function that controls analysis timing (Fig.3).

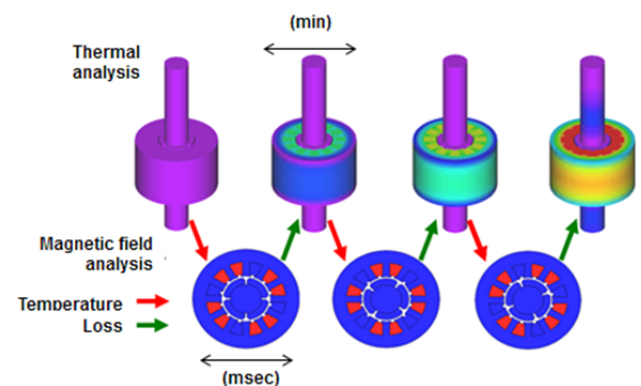


Fig.3: Subcycling of magnetic field / thermal coupling analysis

## JMAG's Approach to Multiphysics Analysis

We have provided a multiphysics analysis function to suit the objective, making full use of the highly-accurate electromagnetic field analysis. The 3 include small multiphysics, easy-to-use coupling analysis interface and coupling with other structural analysis / CFD analysis software.

Small multiphysics has realized low-cost Co-Simulation for cases such as coupling 3D magnetic field analysis model and 1D heat circuit (Fig.4).

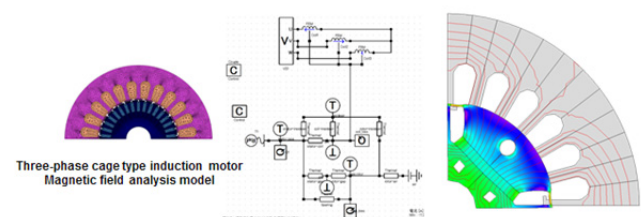


Fig. 4 Magnetic field analysis model and electricity / thermal circuit coupling

To simplify coupling analysis, the analysis group function has been developed. Using this allows association with magnetic field, thermal, and structural models without specifying the reference result file (Fig.5).

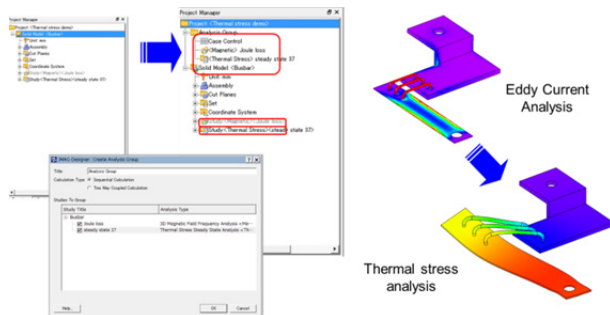


Fig.5: Uniform management of magnetic field, thermal, structural analysis models (analysis group)

There are two types for coupling with other CAE software. One is using an interface / multipurpose file input output tool open to general-purpose formats. The analysis results of JMAG can be output in general formats such as CSV, Nastran, and Universal formats. In addition, same format files output in other CAE software can also be loaded.

The other is a direct interface that allows coupling of JMAG with STAR-CCM+, JMAG with Abaqus, and STAR-CCM+ with Abaqus to run each magnetic field with thermal fluid, thermal fluid with structural, and structural with magnetic field coupling analysis (Fig.6).

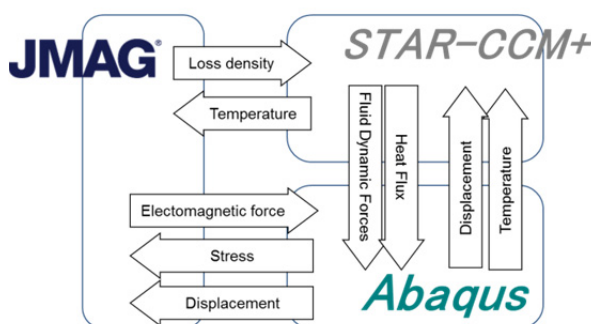


Fig. 6: Coupling of JMAG, Abaqus, STAR-CCM+

Each coupling function and coupling cases using

the functions are introduced below.

## "Coupling of STAR-CCM+ and JMAG"

STAR-CCM+ is an integral CAE software for compound regional issue putting emphasis on fluid analysis. It is used in various production fields, and are known to have one of the largest shares in the world.

STAR-CCM+ has also been developing on technologies to support large-scale models. There are previous cases where a model with 10 billion mesh have been analyzed with parallel calculation of 500CPU. The mesh engine is also independently developed and mesh technologies to capture various phenomena are also in development. The surface wrapping function has realized one of the world's highest levels in usability, speed, and geometry simulation.

In addition, magnetic field and thermal fluid coupled analyses can be performed with loss density and temperature transferred from the inside of JMAG and STAR-CCM+.. It is possible to handle thermal conduction, radiation, and convection as phenomena (Fig.7).

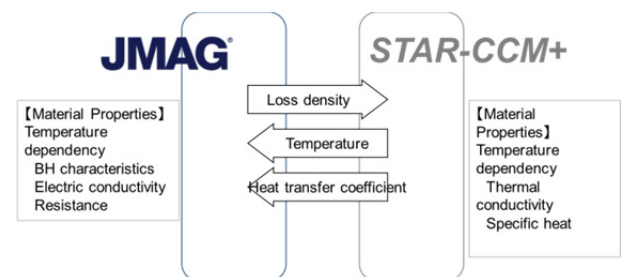


Fig.7 Coupling analysis of JMAG and STAR-CCM+

## Coupling function of JMAG and STAR-CCM+

For the coupling of JMAG and STAR-CCM+, there are two methods of use, one is using the multipurpose file input / output tool or using JMAG-Designer. When using the multipurpose file

input / output tool, it is possible to communicate heat generation density distribution, temperature distribution, and heat transfer coefficient distribution. Also, by using the coupling interface of STAR-CCM+, it is possible to handle displacement accounting for fluid dynamic force obtained in STAR-CCM+ in addition to electromagnetic force using the motion formula defined in JMAG (Table 1).

Table 1: Coupling function of JMAG and STAR-CCM+

Tool	Coupling Type, Direction	Physical amount
Multipurpose file input / output	JMAG → STAR-CCM+	Heat generation density
Multipurpose file input / output	STAR-CCM+ → JMAG	Fluid dynamic force, temperature, speed, displacement
STAR-CCM+ Interface	STAR-CCM+ ↔ JMAG	Electromagnetic force, displacement, fluid dynamic force

\*>: One-way coupling    <>: Two-way coupling

### Example Coupled Analysis with JMAG and STAR-CCM

Typical evaluation cases for multifaceted evaluation, one-way coupled analyses, and two-way coupled analyses linking JMAG and STAR-CCM are shown below (Table 2).

Table 2: Coupled analyses with JMAG and STAR-CCM

Application	Type	Evaluation Details
Rotating machine	Multifaceted evaluation	Evaluating torque with electromagnetic field analysis, evaluating heat generation and cooling with thermal fluid analysis.
Rotating machine	One-way	Rising temperature or cooling evaluation with iron, copper, and magnet eddy current loss as the source of heat.
Rotating machine	One-way	Quick and easy thermal transfer analysis using heat transfer coefficient distribution in JMAG.
Transformer	One-way	Rising temperature or cooling evaluation with iron, copper, and stray loss as the source of heat.
IH Cooking Equipment	One-way	Evaluating internal fluid temperature rise due to induction heating of the metal container.
Induction furnace	Two-way	Evaluating temperature rises due to induction heating of fluid metal, and evaluating fluid agitation due to electromagnet force generated in fluid metal

Below is a temperature distribution evaluation case example assuming the use of a H/EV traction motor. The motor model (Fig. 8) and motor specifications (Table 3) that are used are shown. Along with higher power and higher density of traction motors, how heat can be constrained is becoming a key factor. Due to operating at a wide range of speeds, the heat source or position of the hotspots will differ for each operating point. Taking into account loss distribution that can become heat source at each speed, a temperature distribution analysis was performed, including cooling, by passing this loss distribution from JMAG to STAR-CCM+. Results (Fig.9)

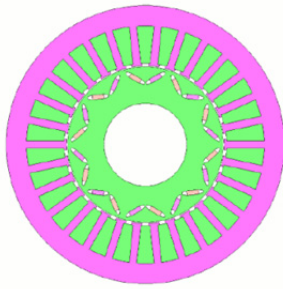


Fig. 8: Motor model

Table 3: Motor specifications

Model name	10k_D_D_IV
Model	PMSM
Output	10(kW)
Power supply	DC240(V)/60(A)
Rotor	IPM
Outer Stator Diameter	185(mm)
Inner Stator Diameter	105(mm)
Stator	Distributed winding
Stack length	37(mm)
Magnet	Neodymium sintered
Inertia Moment	2.79e-3(kg·m <sup>2</sup> )
Weight	9.35(kg)
Maximum current	84.8(Apeak)

\*Using a motor model from the motor model library

<http://www.jmag-international.com/jp/solutions/rt/modellibrary/019.html>

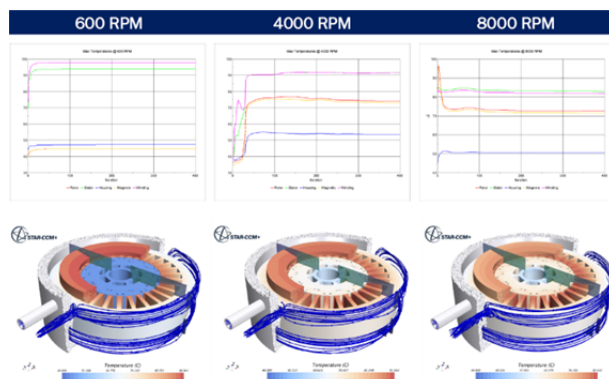


Fig. 9: Thermal fluid analysis results for each RPM

Courtesy: CD-adapco Co., Ltd.

## Linking J MAG and Abaqus

Abaqus can handle a multitude of technical

challenges, such as aerospace, consumer products, energy, life and science industries. Their highly reliable and robust linear and non-linear multiphysics simulation technologies are widely known. Abaqus provides a Co-simulation Engine (CSE), enabling multiphysics analyses to be performed with, J MAG, STAR-CCM+, and other CAE software (Fig.10, 11).

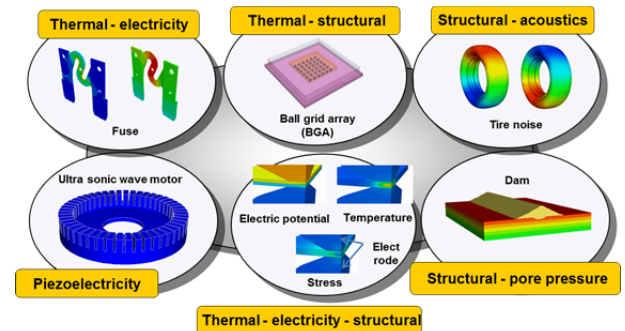


Fig. 10: Multiphysics in Abaqus/Standard

Courtesy: Dassault Systemes K.K. SIMULIA Japan

J MAG and Abaqus are able to perform two-way coupled analysis for magnetic fields and structure with exchanged electromagnetic force, stress, and displacement.

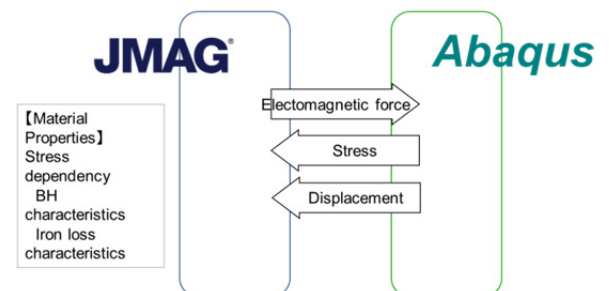


Fig. 11: Coupled analysis with J MAG and Abaqus

## J MAG and Abaqus Coupling Functions

When linking J MAG and Abaqus, there are ways to use CSE, utilize tools for Abaqus, and use multi-purpose file input/output tool (Table 4)

-Using CSE enables two-way transfers for heat generation density, temperature, and displacement.

-Abaqus tools provided by J MAG can transfer heat generation density and electromagnetic force.

-Using multipurpose file input / output tool can incorporate the stress distribution to a JMAG model.

Table 4: JMAG and Abaqus Coupling Functions

Tool	Link Type Direction	Physical Quantity
Co-simulation Engine File base method (Non-CSE link)	JMAG ↔ Abaqus	Heat generation density, electromagnetic force, temperature, displacement
Specifying the heat Source in the Abaqus file	JMAG → Abaqus	Heat source density
Specifying the electromagnetic force in the Abaqus file	Abaqus → JMAG	Electromagnetic force
Multi-purpose file import/export	Abaqus → JMAG	Stress

### Examples of linking JMAG and Abaqus

Typical evaluation cases for multifaceted evaluation, one-way coupled analyses, and two-way coupled analyses linking JMAG and Abaqus are shown below (Table 5).

Table 5: Examples of coupled analysis with JMAG and Abaqus

Application	Type	Evaluation Details
Rotating machine	Multifaceted evaluation	Evaluating torque with electromagnetic field analysis, evaluating stress due to centrifugal force with structural analysis
Rotating machine	Multifaceted evaluation	Stress evaluation due to cramping, material property degradation and heat generation evaluation due to stress
Rotating machine / transformer	One-way	Vibration and sound evaluation using electromagnetic force and magnetostriction as accelerant of vibration and sound.
Rotating machine	One-way	Iron loss evaluation accounting for stress due to shrink fitting/press fitting
Transformer	One-way	Strength evaluation using Lorentz force added to winding as a load.
High-frequency induction hardening	Two-way	Obtain a temperature rise based on Joule loss inside a heated body, account for deformations due to thermal stress, and repeat electromagnetic field/thermal conduction/structural analyses.
Electromagnetic shaping	Two-way	Large electromagnetic force occurs on formable metals (Lorentz force), then instantly deforms the metal. The inside of the deformation is accounted for, and electromagnetic and structural analyses are repeated.

A motor caulking analysis example case is shown below (Fig. 12). In the caulking, which fixes the motor's electromagnetic steel sheet, a short-circuit and stress in the eddy current, due to a tear in the insulation film, causes the material properties to degrade. However, it's not realistic to conform to the caulking geometry and model each single sheet of the laminated steel. Here, using Abaqus allows the range of degradation and stress to be estimated, and by separating the parts in JMAG into ones that will or will not degrade, the effects of characteristic

degradation and eddy current generated in the entire core can be examined. The results are shown as below.

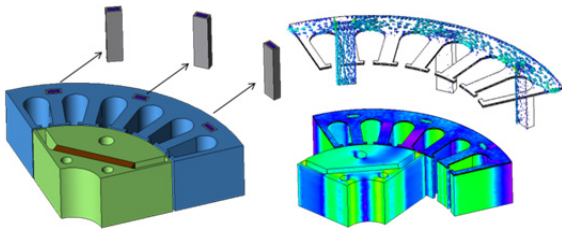


Fig 12: Case example for analyzing eddy current caused by caulking.

## Linking JMAG, STAR-CCM+ and Abaqus

By using JMAG, STAR-CCM+ and Abaqus, coupled analysis for magnetic field and thermal fluid, fluid and structure, and structure and magnetic field can be performed (Fig.13).

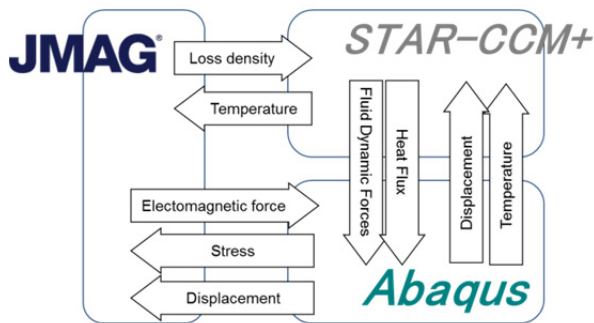


Fig. 13: Coupled analysis with JMAG, STAR-CCM+ and Abaqus

## JMAG, STAR-CCM+ and Abaqus Coupling Functions

Coupled Magnetic field, fluid, and structure analysis using JMAG, STAR-CCM+ and Abaqus is possible. The combined strengths of JMAG, STAR-CCM+ and Abaqus foster an advanced analysis environment for magnetic field, structure, and fluid coupled analysis (Table 6).

Table 6: JMAG, STAR-CCM+ and Abaqus coupling functions

Tool	Link Type Direction	Physical Quantity
Co-simulation Engine	Abaqus ↔ JMAG	Heat generation density, temperature, displacement
Co-simulation Engine	STAR-CCM+ ↔ Abaqus	Fluid force, temperature, heat flux, displacement
JMAG-Designer	STAR-CCM+ ↔ JMAG	Electromagnetic force, displacement Fluid force

## Examples of Coupled Analysis of JMAG, STAR-CCM+ and Abaqus

Typical evaluation cases for one-way coupled analyses and two-way coupled are shown below (Table 7).

Table 7: Examples of linking JMAG, STAR-CCM+ and Abaqus

Application	Type	Evaluation Details
Rotating machine	One-way	Perform an iron loss analysis accounting for effects of stress due to shrink/press fitting and caulking, and then evaluate heat generation and cooling, with iron loss as the source of heat.
Electromagnetic shaping	Two-way	Large electromagnetic force occurs on formable metals (Lorentz force), then instantly deforms the metal. L. The inside of the deformation is accounted for, and electromagnetic and structural analyses are repeated.
Induction heating	Two-way	Obtain a temperature rise based on Joule loss inside a part of a heated body, account for deformations due to thermal stress, and repeat electromagnetic force, thermal fluid, structural analyses.

Below is a case example of iron loss analysis accounting for IPM motor shrink fitting and temperature distribution analysis, with iron loss as the source of heat generation. Abaqus was used to analyze shrink fitting and obtain stress distribution

occurring in the stator core. Iron loss analysis was performed accounting for the effects of stress (Fig.15) Temperature distribution analysis was performed in the case of accounting for iron loss distribution but not degradation, and also for the case of accounting for iron loss distribution and degradation (Fig.16).

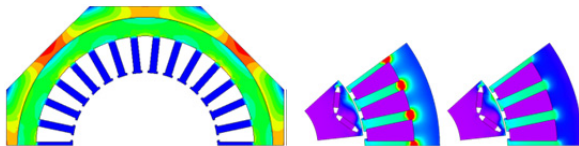


Fig. 15: Iron loss analysis accounting for shrink fitting

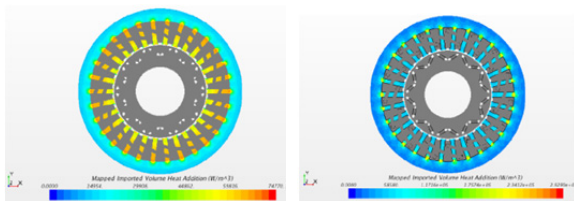



Fig. 16: Temperature distribution analysis accounting for material degradation due to shrink fitting  
(Left: degradation not accounted for    Right: degradation accounted for)

## In Closing

This seminar introduced the solutions provided by the cooperation of these three companies. Lively technical discussions took place during Q&A sessions and continued even during break times. One discussion was held regarding passing physical amounts between the software. The multiphysics solutions for each software are separate, but we are developing an interface while taking the caution necessary when passing physical amounts between different models. We plan to further strengthen the coupling functions between each program. We also received questions regarding support systems.

We are working towards having not only development shared between us, but also for support to be linked as well, so your enquiries can

be made anywhere. We hope you enjoy these features. 

(Yusaku Suzuki)

## Solutions

# Solenoid Valve Analysis Solution

JMAG has supported the solenoid valve analysis since it was first released and has been used for various applications. We introduce solutions using JMAG focusing on the response characteristics evaluation of a solenoid valve in this issue.

## Overview

To accurately regulate the flow volume using a solenoid valve, it is necessary to accurately predict and control the attraction force that activates the valve. Therefore, a solenoid valve is a magnetic device that is often used as an analysis target of the electromagnetic analysis. A wide variety of analyses have been run such as evaluation of response characteristics by combining motion and drive circuit as well as thrust power of plungers. This issue introduces solutions for response characteristics evaluation of solenoid valves using JMAG.

To evaluate response characteristics of a solenoid valve, handling of attraction that works on the plunger, that is handling of electromagnetic force is important. Electromagnetic force is determined by the magnetic properties consisting of a solenoid valve, but an analysis accounting for the influence of eddy current and the remnant magnetization is necessary depending on the material characteristics or environment. This issue introduces the effect of eddy current or remnant magnetization on the response properties through some case studies.

Also, the solenoid valve is commonly used as a component in the system and the control target. In terms of the evaluation of the response properties, it is necessary to analyze the response properties

of the entire system including the solenoid valves, not just a single solenoid valve. This issue also introduces some cases that analyzed response properties from the view point of system control simulation.

## Impact of Eddy Current

High speed response is often required for the on-off valves which just open and close the valve, but it may result in a design issue because of eddy current occurring in plunger or stator. Since the occurred eddy current obscures the principle magnetic flux and necessary attraction force cannot be obtained after current starts flowing, it is displayed as a delay in the start point of the response waveform. Since the eddy current tends to flow concentrating on the metal surface (skin effect), a modelling accurately accounting for the skin effect is required.

Such a modelling is possible by generating mesh (skin mesh) with a sufficient resolution within the skin region where eddy current occurs. The figure 1 shows an example with slots added on the stator surface to suppress the effect of the eddy current. This example compares and evaluates the improvement of the response characteristics after the current flows between with slots and without slots, and approximately 20 % of improvement was seen by controlling the eddy current flow using the

slots.

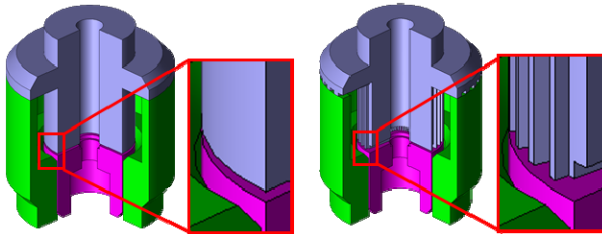


Fig.1 Stator without slots (left) and with slots

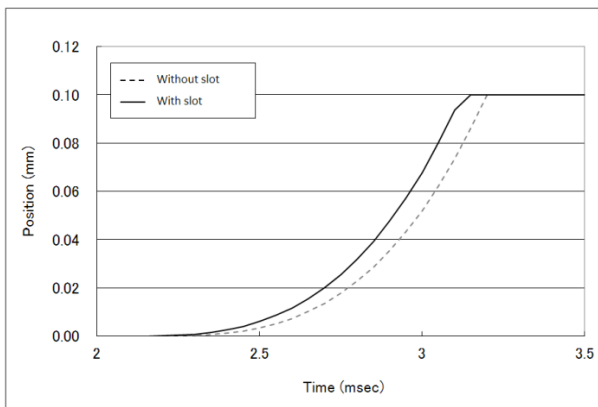


Fig. 2 Comparison of response wave (displacement amount) between with slots and without slots

## Remnant magnetization effect

As the degree of detail is improved, the effect of the remnant magnetization may cause the difference between the actual measurement and analysis. Since the remnant magnetization is caused by magnetic hysteresis characteristics and contributes to the attraction, it has an effect on the response wave such as displacement amount.

For analyses using JMAG, we continue to pursue development of new technologies regarding material modeling, such as magnetic hysteresis including the remnant magnetization and provide related products. Also for solenoid valve designs, some case studies handling the effect of the remnant magnetization on the attraction have been presented in our user's conference (1).

Examples comparing the attraction force and response characteristics (displacement amount)

between with remnant magnetization and without remnant magnetization including eddy current are shown here (Fig 3, 4). In Fig. 3, the waveform from the start of the attraction force to the peak value (to 2 (msec)) shows the decreased attraction force because magnetization is shielded by the eddy current, but does not show the effect of the remnant magnetization. This is because the initial state of the analysis is assumed to start from the origin of the magnetization curve without remnant magnetization. The flat attraction wave shows that displacement is stabilized by the current constant control. An analysis accounting for the remnant magnetization causes larger attraction force than an analysis that does not take into account it.

Also, in the response waveform in Fig. 4, response just after turning off the current shows delay in the analysis accounting for remnant magnetization. This is because plunger starts moving after the restoring force of a spring exceeds the attraction force due to remnant magnetization. You will see that the attraction force causes a significant impact on the response characteristics in the material where remnant magnetization occurs.

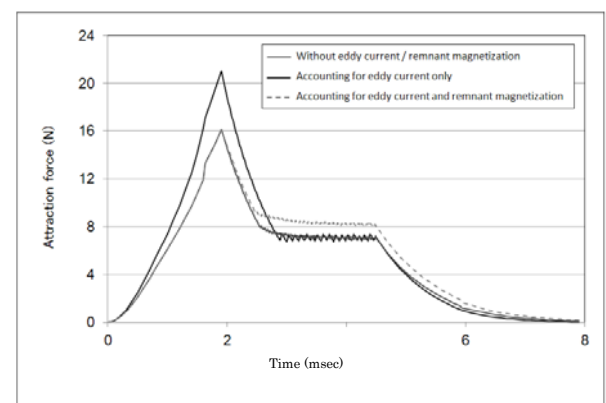


Fig. 3 Comparison of attraction force between with and without eddy current / remnant magnetization

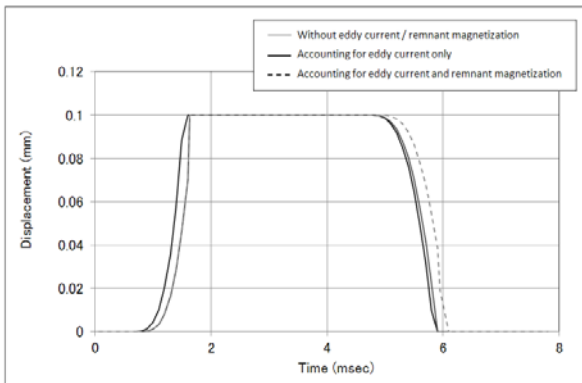


Fig. 4 Comparison of response wave (displacement amount) between with and without eddy current / remnant magnetization

## System control simulation

A solenoid valve in the system is a control target (plant) from the system point of view and treated as an equation model written in the motion equation or voltage equation. Although feature of each product is shown as a coefficient of equation such as mass and inductance, all features of the product cannot be applied to an equation with only limited number of items. For example, inductance for a solenoid valve cannot be displayed as a constant coefficient value since the magnetic circuit considerably varies depending on the displacement of the plunger or drive current. Therefore, technology incorporating a detailed plant model into the control simulation as a substitute of the equation model is required.

JMAG allows you to try the following two approaches.

First, there is a method to use an infinite element model as is (hereafter called direct coupling). An analysis is proceeded exchanging the data of voltage, current, position information and attraction force bi-directionally between JMAG and a control simulator. Since both simulators are directly connected, phenomena of eddy current occurring in the controlled plant model can be analyzed together with the detailed system control simulation. Therefore, the direct coupling is an appropriate

method to look at the detailed electromagnetic phenomena occurring in the plant model during the control.

The second method extracts the necessary plant model information with a control simulator from the infinite element model and refers to it as a table data. JMAG provides a solution called JMAG-RT, which creates table data after extracting the plant model information from an infinite element model. The method to perform control coupling using this plant model is hereafter called JMAG-RT coupling. By providing the required motion region as a table instead of a plant model using an equation composed of a constant coefficient value which was utilized within the conventional control simulator, a control simulation reflecting material and geometry properties for each moving point can be performed.

Unlike in the case of the two-way direct coupling, this method operates only the control simulator and behavior of the eddy current occurring in the plant model during control cannot be confirmed at the same time, but it can realize faster analysis than the direct coupling. This is an appropriate method to check the attraction force and response of the solenoid valves from the system control point of view. Also, taking advantage of its high-speed characteristics, search and adjustment of gain parameters suitable for the system control are possible (Fig. 5 and 6).



## WEB

# JMAG Tutorial Videos

The JMAG website ([www.jmag-international.com](http://www.jmag-international.com)) introduces many JMAG features including the latest functions in the tutorial videos. See the videos to get a grasp of the look and feel.

## How to access the videos

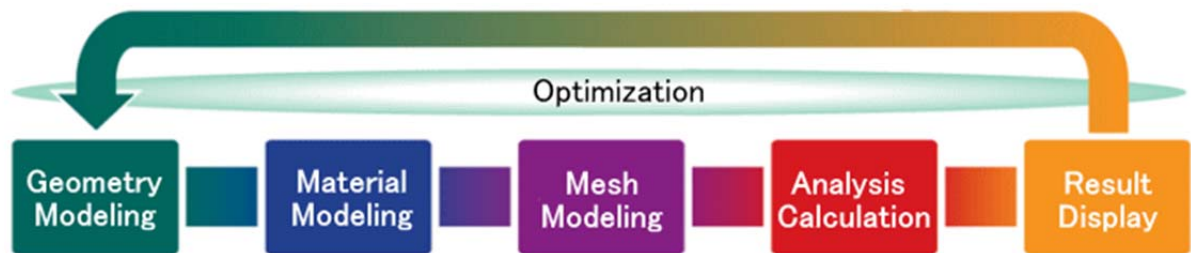
With just 3 steps, you can watch the video of your choice

The diagram illustrates the process of accessing JMAG tutorial videos through three steps:

- Step 1:** Click the JMAG-Designer Products page Or click the banner. This step is shown on the left side of the JMAG website screenshot, where the 'Products' menu is open and 'JMAG-Designer' is highlighted. A banner for 'This Week's Function Video' is also visible.
- Step 2:** Click a video category. This step is shown on the right side of the website, where the 'JMAG Function Videos' section lists various categories like Geometry Modeling, Material Database, Mesh Modeling, Outcome evaluation, Magnetic field analysis, and Structure Analysis. The 'Structure Analysis' category is highlighted.
- Step 3:** Click the start button of the video Start automatic replay. This step is shown in the bottom right, where three video thumbnails are displayed: 'Eigenmode Analysis', 'Calculation of Sound Pressure', and 'Calculation of Stress and Displacement by Centrifugal Force'. The 'Start' button on the first video thumbnail is highlighted.

## Video Category

Over 50 tutorial videos explaining the flow of analysis

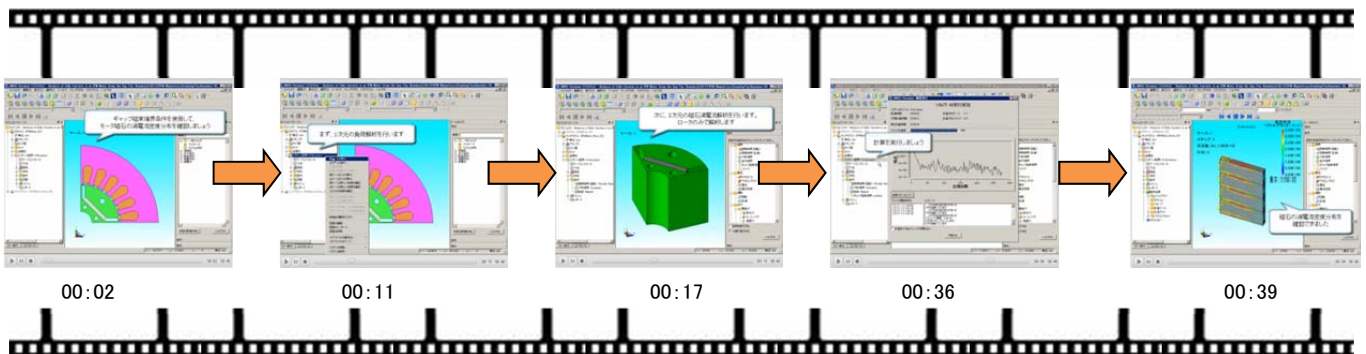


<ul style="list-style-type: none"> <li>• Coupling with CAD systems</li> <li>• Creating 2D geometries</li> <li>• Expanding models from 2D to 3D</li> <li>• Creating coil end geometries</li> <li>• Accounting for magnetic gap</li> <li>• Response analysis of rotors etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Magnet settings using magnetization analysis</li> <li>• Reusing demagnetized magnets</li> <li>• Temperature dependent B-H characteristics</li> <li>• Temperature dependent heat / mechanical properties</li> <li>• Accounting for production degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Simplifying geometries</li> <li>• Defeature</li> <li>• Changing dimensions of the mesh model</li> <li>• Morphing</li> <li>• Generating mesh accounting for Skin effect (skin thickness)</li> <li>• Generating mesh accounting for motion (Generating mesh for each analysis step)</li> </ul>	<ul style="list-style-type: none"> <li>• Magnetic field analysis</li> <li>• Structural analysis</li> <li>• Thermal analysis</li> <li>• Magnetic field analysis</li> <li>• Circuit coupling</li> <li>• Small multiphysics</li> <li>• Multiphysics</li> <li>• Optimization</li> <li>• Automation/Script</li> </ul>	<ul style="list-style-type: none"> <li>• Recording and executing operation script</li> <li>• Creating templates for materials, conditions, and result evaluation settings</li> <li>• Density control of difference display vector for 2 results</li> <li>• Result distribution display for each part</li> <li>• Multipurpose file output</li> </ul>
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## Flow of Tutorial Videos

Videos are approximately 1 to 2 minutes long. Check them out.

Example: Magnet eddy current analysis



Script:

- 00:02 Use the gap boundary condition and confirm the eddy current density distribution of the motor magnet
- 00:11 First, run the 2D load analysis
- 00:17 Next, run the 3D magnet eddy current analysis
- 00:36 Run the calculation
- 00:39 Confirm the current density distribution of the magnet

More tutorial videos introducing features will be coming soon.

Inform us of any features you would like to know more about. We look forward to hearing from you.

Videos can also be accessed from YouTube.



<http://www.youtube.com/user/JMAGTV>

# Common Questions for JMAG

JMAG is used across a broad spectrum spanning from advanced research and development through to product production design and in educational fields. Users reading this newsletter may feel that they still haven't fully mastered JMAG's capabilities, or perhaps feel a bit lost about how to set it up. When user come up against obstacles in using JMAG, of course there's always Technical Support, but don't forget there are also FAQs on our website that can be used to solve problems.

In this issue, we will select from those FAQs four questions from the FAQ that have been asked a lot recently. We have divided the questions into three categories of "Operation Methods," "Analysis Technologies" and "Troubleshooting," so please pick the category in which you are most interested.

## OPERATION METHODS FAQ-941

### Q1. Can deformed mesh information obtained in structural analysis be output?

I obtained a deformed state due to thermal expansion in structural analysis, but I am hoping to use it in another program. It seems that even when using the multipurpose file output tool, only mesh information before deformation can be output. Is there a possible solution?

### A1. In magnetic field analysis, incorporate results in structural analysis using the displacement condition. Mesh information after deformation can be obtained.

Mesh information cannot be directly output from the result file of structural analysis, but by using the displacement condition in magnetic field analysis, it is possible to output mesh information after deformation. The method is listed below.

- 1) Run structural analysis and obtain the result file with displacement information.
- 2) Create a magnetic field analysis study with the same mesh information as analysis 1.
- 3) Use the displacement condition and refer to the result file obtained in 1.
- 4) Run magnetic field analysis and obtain the result file.
- 5) Write with the Nastran file using the result file of 4 through the multipurpose file output tool.

Deformation applied using the displacement condition assumes micro deformation.

Use caution when the displacement amount is large, since there is a chance that the surrounding mesh cannot retain its geometry and may fail.

【Other references etc.】

Please see the help below for more information regarding displacement conditions.

[JMAG-Designer Help> Analysis > Magnetic field analysis study properties and condition settings > Displacement > Displacement conditions](#)

## OPERATION METHODS FAQ-918

### Q2. Please tell me how to run multiple calculations simultaneously.

The computer I am currently using has sufficient JMAG licenses and computing power so it will most likely be able to handle multiple analyses.

How can I run multiple analyses?

### A2. Use JMAG-Scheduler and change the settings of [Simultaneous Number of Jobs].

From the menu window in JMAG-Scheduler, select [Settings] > [Number of Jobs] and change the settings for [Simultaneous Number of Jobs].

The number of jobs to be simultaneously run can be set here.

Furthermore, [Limit number of jobs by solver type] check box has been added to JMAG-Designer 12.1 and later.

For example, when the 3D transient analyses only has 1 license but 3D transient analysis has 2 licenses, simply set [Limit to 3 jobs]. When 3 is set for 2D transient analysis, one of them will show an insufficient license error.

In that case, set the number of jobs for each analysis type.

JMAG-Scheduler is a management tool for analysis calculations independent of JMAG-Designer.

JMAG-Designer cannot be operated until the analysis ends when you right-click on a study in JMAG-Designer and select [Run Active Case] or [Run All Cases].

When running model generation or results evaluation during analysis in JMAG-Designer, select either [Submit Active Case to Queue] or [Submit All Cases to Queue].

Select run patch to have JMAG-Scheduler manage analysis jobs. This allows operation of JMAG-Designer during analysis.

【Other references etc.】

Please see the help below for more information regarding the functions in JMAG-Scheduler.

[JMAG-Designer Help> Analysis > Run Analysis > Continuous Calculation Using JMAG-Designer](#)

### Q3. What are the ideal hardware specs for MPP parallel computing?

Since the number of calculating 3D model analyses are increasing, I am reconsidering my hardware specs for calculation. I am thinking of using the Massively Parallel Processing (MPP) parallel computing function. What are the recommended specifications?

### A3. When using the MPP parallel computing function, prepare a computing environment where connection speed will not be a problem.

The MPP parallel computing function enables parallel processing by using multiple computers (clusters) connected to the network. It is also possible to use multicore inside the CPU in addition to the multiple CPUs in the cluster. A higher degree of parallelism than the a conventional analysis is possible, and further boosts in speed can be expected.

Selecting the right hardware is important in obtaining high parallel function when using the JMAG MPP solver. First, select a CPU with high memory bus function such as Intel Xeon E5 and later for each node. By filling in all memory slots where physical memory is inserted, the parallel function of the hardware can be enhanced (Fig.1).

This solver can calculate using the multicore in a single node, but it is recommended to use multiple nodes for high parallel computing. For this case, please use Infiniband for the network between nodes.

Compatible operating systems are the following. All are 64bit OS.

Windows

Microsoft Windows 7

Microsoft Windows HPC Server 2008 R2

Linux

RedHat Enterprise Linux 5、 6

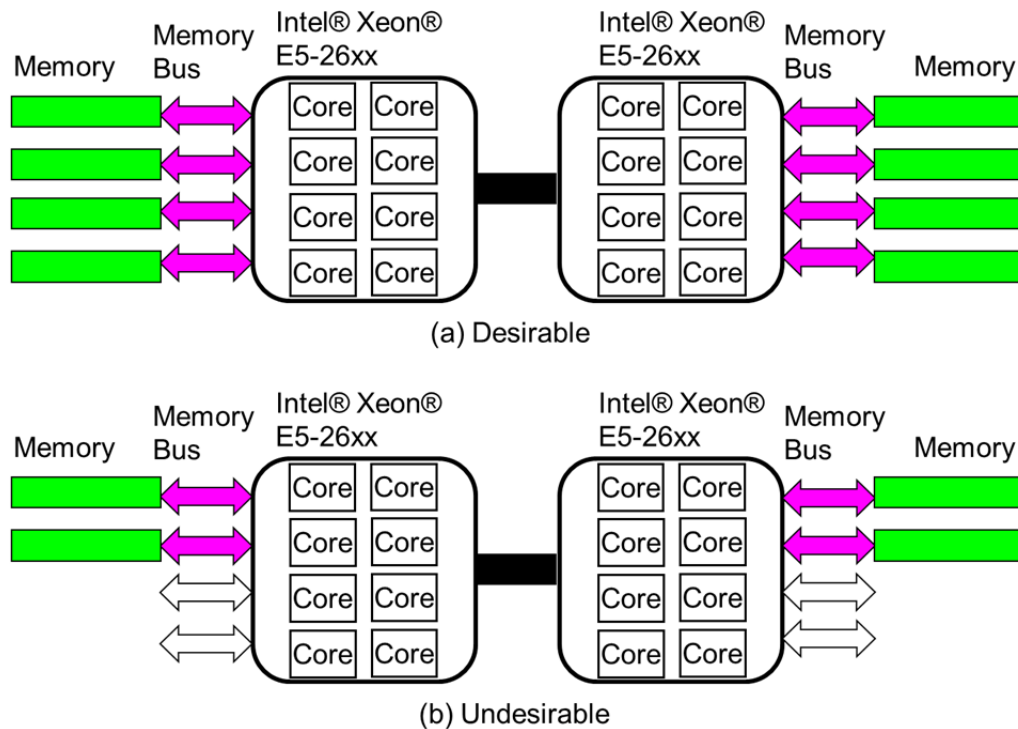


Fig. 1 Example of hardware structure

(Up: good example with filled up memory slots, bottom: bad example with leftover memory slots)

【Other references etc.】

Please see the help below for more information regarding system preparation of MPP parallel computing.

[JMAG-Designer Help > Functions of Analysis > Magnetic Field Analysis > Study Properties](#)

[> Solver Control > Parallel Computing \(MPP\) > Preparing the Environment and Operating MPP Parallel Computing](#)

## OPERATION METHODS FAQ-943

**Q4.** How do I automatically collect results after running a parametric calculation?

**A4.** By combining the response graph function, the result calculation function, and the evaluation function of the optimization feature, various results can be collected.

For example, when creating a relationship graph of current amplitude-efficiency, run a parametric calculation with current amplitude, and define the calculation formula of efficiency as evaluation function. Afterwards, create a new response graph, and specify the current amplitude in the X-axis and efficiency in the Y-axis to obtain the current amplitude-efficiency characteristics graph.

Please see below for the detailed procedures.

Data to use: Install folder of JMAG-Designer/sample/2dmotor/2D\_PM\_motor.jproj

## Study: 2D\_PM\_motor\_load

- 1) Run a parametric calculation where the current amplitude is the variable.
  - I. Check [Amplitude] of [Three-phase Current Source] in [Case Control] > [Select Parameters..] and set "Iamp" as the variable name.
  - II. Set 2, 6, 10 in each Iamp after adding 3 cases in [Case Control] > [Show Cases].  
4 cases, Iamp = 4, 2, 6, 10 are created.
  - III. Run [Run All Cases...].
- 2) Register important information in efficient calculation as the response value.
  - I. Register the torque average value as the response value.
    - i. Display [Torque] from the [History Graph].
    - ii. Select [Response Graph Data] from [Calculation] in the menu.
    - iii. Set [Simple Average] as the calculation method, select "Coil" as the target, and "JouleLoss" as the variable name. Use the default settings for the rest.
    - iv. Click [Register as Response Data] in the table obtained after clicking [OK].
  - II. Register the joule loss of the coil as the response data.
    - i. Display [Joule Loss] from [History Graph].
    - ii. Select [Response Graph Data] from [Calculation] in the menu.
    - iii. Select [Integration Average] as the calculation method, and "Torque" as the variable name. Use the default settings for the rest.
    - iv. Click [Register as Response Data] in the table obtained after clicking [OK].
  - III. Register the rotation speed as the response value.
    - i. Check [Constant Revolution Speed] of [Motion: Rotation] in [Case Control] > [Select Parameters] and set "Vel\_rpm" as the variable name.
- 3) Define a formula that calculates the efficiency in the evaluation function of the optimization feature.
  - I. Click [Add] in [Case Control] > [Optimization] > [Objective Function].
  - II. Set the following in the explanation and formula.  
Explanation: Efficiency  
Formula:  $2\pi \cdot \text{Vel\_rpm} / 60 \cdot \text{Torque} / (2\pi \cdot \text{Vel\_rpm} / 60 \cdot \text{Torque} + \text{JouleLoss})$
- 4) Create a graph with current amplitude as the X-axis and efficiency as the Y-axis in the response graph.
  - I. Create New in [Response Graph] > [Graph].
  - II. Set the following for the X-axis and the Y-axis.  
X-axis: 3-Phase Power Supply (3-Phase Current Source): Amplitude  
Y-axis: Efficiency
  - III. The current amplitude - efficiency characteristics graph of Fig. 2 can be obtained.

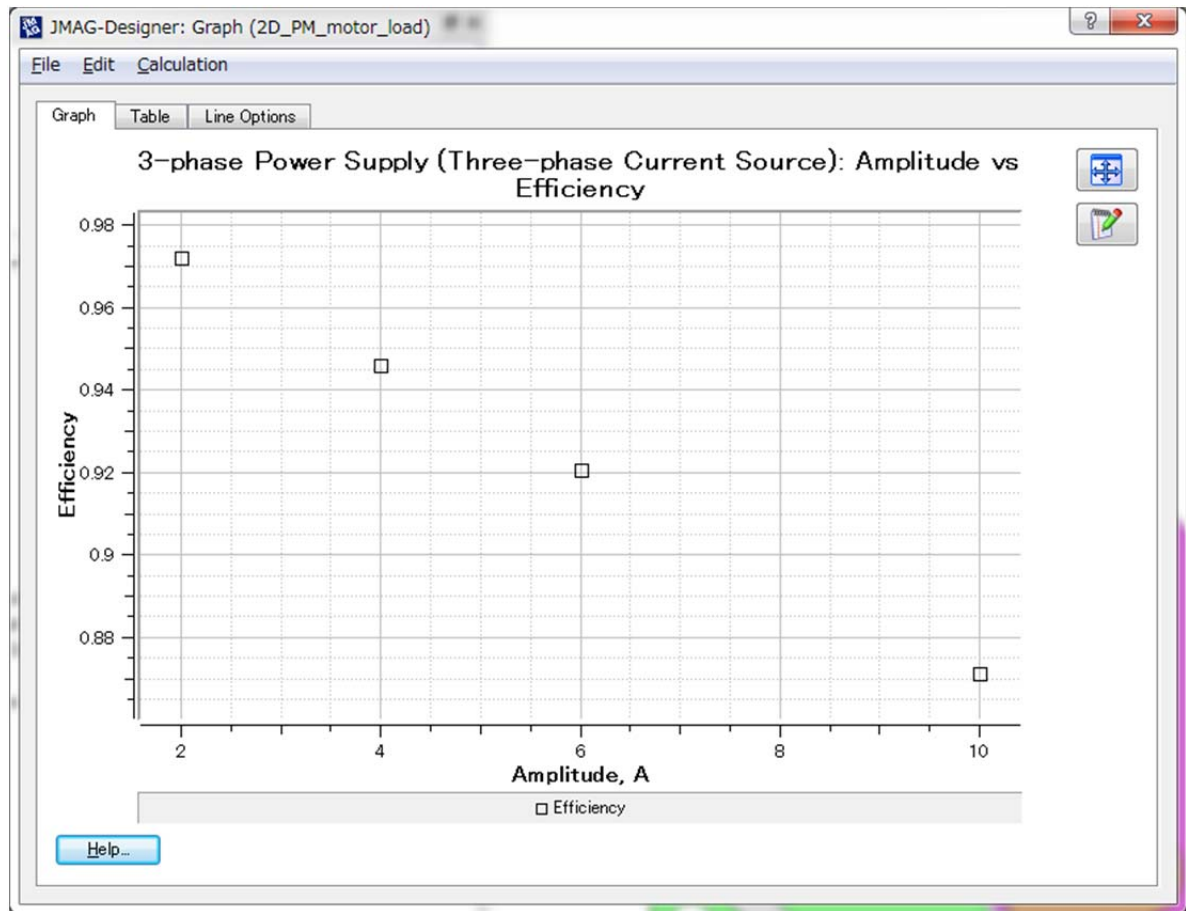


Fig .2 Current amplitude - efficiency characteristics graph

【Other references etc.】

Please see the Help below for more information regarding the response graph.

[JMAG-Designer Help> Result Display > Response Graph > Response Graph](#)

## ANALYSIS TECHNOLOGIES FAQ-922

**Q5.** What is a method to easily evaluate the torque characteristics of an induction motor?

**A5.** If it is evaluating the specific characteristics, transient response magnetic field analysis must be run, but for evaluating torque characteristics in a steady state, try frequency response magnetic field analysis.

Below are the points to take note of when analyzing an induction motor in frequency response magnetic field analysis.

When obtaining torque operating against a rotor in an induction motor, focus on the rotating magnetic field occurring in the rotor of the induction motor. For example, when presuming an induction motor of 1500rpm rotation speed, the rotating magnetic field occurring in the coil of the stator is 1500rpm.

If the rotation speed of the rotor is 1350rpm, the difference in rotation speed between the magnetic field caused by the coil and the rotor would be 150rpm, then the conductor of the rotor would be exposed to the time-varying field and induced current will flow. To obtain the torque of the rotor, evaluate the eddy current caused by the rotation speed felt by the rotor. This will allow summary evaluation using frequency response analysis.

As for reducing calculation time, fix the position of the stator and rotor and run current of slip frequency equivalent to 150rpm in the coil of the stator.

#### 【Other references etc.】


Case studies running analyses based on the idea above are introduced in the application catalogue.

[63 - torque characteristics analysis of cage-shaped inductance motor](#)

## Technical FAQ on WEB

We have technical FAQ on our homepage, so come take a look if you have any questions:

URL: <http://www.jmag-international.com/support/faq/index.html> (User verification required)

The technical FAQ is a collection of actual questions from our clients, so you might discover some new ways to use JMAG if you go through them. We regularly update our website FAQ. Use this together with the JMAG Newsletter to make your analysis work more effective. Please don't hesitate to use JMAG technical support if you have any questions when using JMAG. We hope you will fully master JMAG! 

(Takashi Kondo)

## Event Information

# Information on the JMag Users Conference in Germany

Building on last year's success, countries around the world will play host to a JMag Users Conference 2014. In this issue, we are pleased to announce one in Germany.

JMag Users Conferences are programs that emphasize engineers communicating with each other. They are an excellent chance to collect information on the ways that electromagnetic field analysis is being used and other topics, so please attend if you are able.

## JMag Users Conference in Germany

The JMag User's conference will be held.

### Conference Outline

Host: POWERSYS

Date: Tuesday, September 9th - Wednesday, September 24th, 2014

Venue: Steigenberger Airport Hotel (Frankfurt, Germany)

URL: [http://www.powersys-solutions.com/JMAG\\_UC/](http://www.powersys-solutions.com/JMAG_UC/)



The Europe JMag User's conference will be held.

The event will take place over two days: The first day will be a technical day, and the second day will have user presentations.

Workshops focusing on iron loss and efficiency maps functions as well as workshops covering the electric automobile industry will be held. They are an excellent chance to collect information on the ways that electromagnetic field analysis is being used and other topics. Please attend if you are able.

## Day 1: JMag Technical Day

9:00	3 sessions in parallel: #1 -Basic Training #2 - Motor Design Training #3 - One-to-One meeting
13:30	Interactive Show-Case Advanced Demo
16:15	JMAG V13.1: New features training and demos.

## Day 2: JMAG User's Conference

09:15	<b>Recent developments and roadmap</b> JSOL Corp.
10:15	<b>Title to be determined</b> Application Engineer, POWERSYS
10:45	<b>Comparison between 5 and 6 Phases Claw Pole Alternator,</b> Bassel Aslan and Radu Fratila - Simulation Engineers - Electric Machines Design Department, VALEO
11:15	<b>JMAG-RT as Part of the Development Process for EV/HEV Powertrain Components</b> Rafael Gries and Benjamin Cole, DENSO INTERNATIONAL EUROPE
11:45	<b>Use of JMAG in automotive applications</b> Bernd Cebulski, Team Manager Advanced Engineering Powertrain, IAV GmbH
14:15	<b>Comparison of axial-flux and radial-flux-machines for use in wheel-hub-drives</b> Marcel Lehr – M.Sc., Kersten Reis – Dipl.-Ing., Andreas Binder – Prof. Dr.-Ing., Institut für Elektrische Energiewandlung, Technische Universität Darmstadt
14:45	<b>End of the users conference</b>

## Event Information

# Exhibitions and Events for September through October, 2014

JMAG will hold exhibitions at events both in Japan and overseas. Please stop by our booth and take a look at JMAG's activities. We would like to take this opportunity to introduce events and exhibitions for September and October of this year.

Starting early September, we will begin accepting priority attendance registrations (early birds). We will provide more information at that time.

## International Conference on Electrical Machines (ICEM 2014)

A booth will be open.

### Conference Outline

Host: VDE Prüf- und Zertifizierungsinstitut GmbH

Date: Tuesday, September 2nd - Friday, September 5th, 2014

Venue: Andel's Hotel (Berlin, Germany)

Booth number: 2

URL: <http://conference.vde.com/icem/pages/welcome.aspx>

ICEM is an international exhibition and conference pertaining to electric devices.

Presentations of JMAG's newest functions, as well as demonstrations of JMAG-Express, will be given at our booth.

## IEEE Energy Conversion Congress and Exposition 2014 (ECCE 2014)

A booth will be open.

### Conference Outline

Host: IEEE

Dates: Sunday, September 14 - Thursday, September 18, 2014

Venue: David L. Lawrence Convention Center (Pittsburgh, U.S.)

URL: <http://2014.ecceconferences.org/>

ECCE (Energy Conversion Congress and Exposition) is a society sponsored by IEEE that focuses on energy.

Presentations of JMAG's newest functions, as well as design demonstrations of JMAG-Express and JMAG-RT Viewer, will be given at our booth.

## Coil Winding, Insulation & Electrical Manufacturing Exhibition (CWIEME CHICAGO)

A booth will be open.

### Conference Outline

Host: i2i Events Group

Date: Tuesday, September 30th - Wednesday, October 1st, 2014

Venue: Stephens Convention Center (Chicago, U.S.)

Booth number: Hall 1-5 / 1815

URL: <http://www.coilwindingexpo.com/chicago/>

Coil Winding is an exhibition presenting products relating to winding machines, motor stators and insulating paper. At the JMAG booth, we will be doing demonstrations of motor and transformer design case examples using JMAG-Designer Ver.13.1. The popular presentations held at our booth in Berlin on June will also be held.

## JMAG Users Conference in JAPAN

The JMAG User's conference will be held.

### Conference Outline

Host: JSOL Corporation

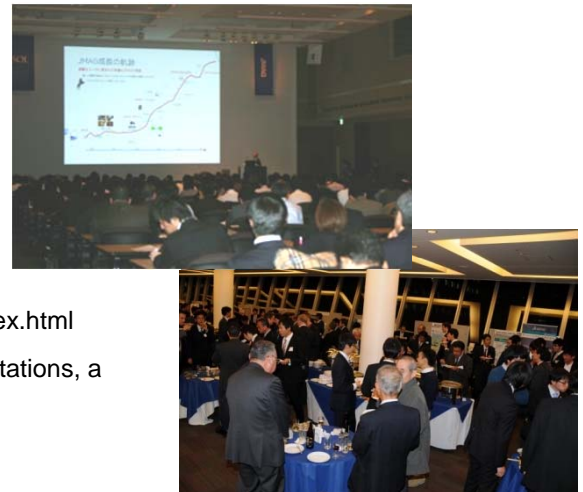
Date: Wednesday, December 3rd - Thursday, December 4, 2014

Venue: Tokyo Conference Center (Tokyo, Japan)

URL: <http://www.jmag-international.com/event/conference2014/index.html>

The conference will contain a keynote speech, JMAG user presentations, a presentation from JSOL, and also exhibitions from our partners.

We will have more details in our next issue.




## Announcing Priority Attendance Registration (Early Birds)

Starting early September, we will begin accepting priority attendance registrations (early birds).

We will send early bird registrants an application before general registration.

The registration period is limited, so please apply early.

We are also planning exhibitions and seminars in countries around the world. Please have a look at the information on our website. 

<http://www.jmag-international.com/event/index.html>

(Tomomi Igarashi)

## Event Information

# JMAG Recommended Seminar Introduction

JMAG-Express workshops and JMAG-RT seminars will be held in September. Useful features and problem solving methods will be introduced for each program.

## JMAG-Express Workshop

A workshop will be held.

### Conference Outline

Host: JSOL Corporation

Date and Venue: Friday, August 29th (Osaka, Japan)      Thursday, September 4th (Tokyo, Japan)

Thursday, September 11th (Nagoya, Japan).

Friday, September 19th (Ibaraki, Japan)      Wednesday, September 24th (Fukuoka, Japan).

Thursday, September 25th (Hiroshima, Japan)      Friday, September 26th (Nagano, Japan)

Enrollment limit: 4 to 10 participants per session (differs depending on location)

For: those involved in motor design, those who use JMAG-Express

URL: [http://www.jmag-international.com/jp/seminar/op/express\\_ws2014\\_1.html](http://www.jmag-international.com/jp/seminar/op/express_ws2014_1.html) (Japanese only)

This is a great opportunity to observe the design process using JMAG-Express as well as share your thoughts with other users. We will introduce useful ways of using JMAG-Express, the newest features, and features currently under development. There will be many topics only available to be discussed at the workshop. We look forward to your attendance.

## JMAG-RT Seminar for MBD

A seminar will be held.

### Conference Outline

Host: JSOL Corporation

Date: Thursday, September 18th

Venue: JSOL Corporation Head Office (Harumi) seminar room (Tokyo, Japan)


Enrollment limit: 50

For: Those who wish to improve model-base development, those who are already using JMAG-RT, and for also those who are considering using JMAG-RT.

Those who use JMAG-RT to develop and run their model base, as well as those who have stopped using JMAG-RT

URL: <http://www.jmag-international.com/jp/seminar/op/jmag-rt.html> (Japanese only)

Topics such as methods to create a model mediating real-time 3D effects when trying to improve motor MDB, and problems with not being able to simulate the characteristics of an actual machine as planned will be covered. This seminar will serve as a venue for everybody to share challenges and solutions. We hope that those interested in improving motor

MDB, and those still undecided about using JMAG-RT will attend. 

There are various other seminars to match your level of proficiency and your type of analysis. Please have a look at the information on our website.

<http://www.jmag-international.com/event/index.html>

(Tomomi Igarashi)

## Event Information

# Event report for June - August, 2014

Attendees report on events held from June to August, 2014. We hope you will attend our next event.

## A seminar called "Engineering with the Cloud" was held to exhibit the power of the cloud for manufacturing industry.

A lecture was held.

### Conference Outline

Host: IBM Japan

Date: Friday, June 13th, 2014

Venue: Tokyo Conference Center (Tokyo, Japan)

URL: <http://www-06.ibm.com/ibm/jp/cloud/event/eocs/index.html> (Japanese only)

IBM Japan is hosting this seminar on the cloud, and is reporting on running JMAG-SMP and MPP in SoftLayer.

This seminar is the first to venture into cloud computing designed for HPC and CAE engineering. We have collected information from many of those who work in the IT field for manufacturing, use JMAG, and from users of CAE software.

I felt that we aren't far from a time where the cloud can handle many unique cases for electromechanical design and high-speed calculation requests.

(Yusaku Suzuki)

## Coil Winding, Insulation & Electrical Manufacturing Exhibition (CWIEME BERLIN)

A booth was open.

### Conference Outline

Host: i2i Events Group

Date: Tuesday, June 24th - Thursday, June 26th

Venue: Messe Berlin (Berlin, Germany)

Booth number: 1.1 / C11

URL: <http://www.coilwindingexpo.com/berlin/>

The Coil Winding exhibition presented products relating to winding machines, motor stators and insulating paper.

There are many large transformer and wind generated power exhibits.

Solutions for motor designers and solutions for large-scale transformers, particularly using JMAG-Express, were introduced in presentations at the JMAG booth.

This year, a 4-meter tall JMAG display was set up, introducing cases for transformers and using JMAG-VTB. We noticed that the overwhelming size of the display drew eyes from all around.

We were impressed that this year for the first time, more people came to see the transformer maker than the induction motors.

(Isabelle CANTUEL)

## 2014 Altair Technology Conference

A seminar and booth was open.

### Conference Outline

Host: Altair Engineering, Inc.

Date and Venue:

Germany (Munich) Tuesday, June 24th - Thursday, June 26th      Dolce Munich Unterschleissheim

JAPAN (Tokyo)      Thursday, July 17th - Friday, July 18th      ANA Intercontinental Hotel Tokyo

URL: <http://www.altairatc.com/Default.aspx>

The Altair Technology Conference is a conference hosted by Altair, held in many countries all over the world. JMAG gave a presentation in Germany and JAPAN.

The HyperWorks technical seminar served as a venue to gather information on the latest technologies and products. Each session and Q&A session was very productive. I was also surprised by the number of people in Germany who asked questions such as "How should I start using JMAG?". I hope that our partnership with Altair strengthens and we foster ever-growing relations.

(Toshie Furubayashi)



## "The fundamentals of magnetic field analysis technology for magnets and magnetic materials" during the first semester of 2014 at Terakoyajuku BM.

A seminar was held.

### Conference Outline

Host: The Japan Association of Bonded Magnetic Materials

Date: Friday, July 18th, 2014

Venue: TOYO Technica, Technology Interface (TI) Center      (Tokyo, Japan)

URL : [http://jabm.la.coocan.jp/registration\\_terakoya.html](http://jabm.la.coocan.jp/registration_terakoya.html)      (Japanese only)

Continuing from last year, The Japan Association of Bonded Magnetic Materials (BM) hosted Terakoyajuku BM.

Focusing on over 30 customers affiliated with materials, the lecture was conducted in an easy-going atmosphere where questions could be asked at any time. During the second half of the lecture, we saw actual use cases of how material analysis technologies, introduced during the first half of the lecture, are used. Participants commented on how finite element analysis felt so familiar to them.

(Takayuki Nishio)

## TECHNO-FRONTIER 2014

A booth was open.

### Conference Outline

Host: Management Association

Date: Wednesday, July 23rd - Friday, July 25th, 2014

Venue: Tokyo Big Sight (Tokyo, Japan)

Booth Number: 3C-201

URL: <http://www.jma.or.jp/tf/en/index.html>

TECHNO-FRONTIER, hosted by Tokyo Big Sight attracted over 30,000 visitors, despite the midsummer heat.

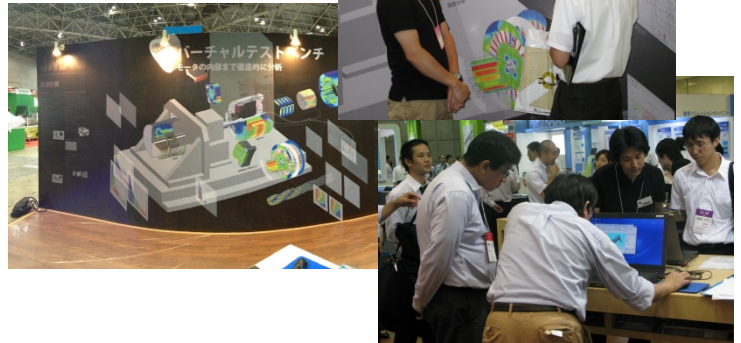
At the JMAG booth, we demonstrated the newly released JMAG-Designer Ver.13.1, JMAG-Express, our motor design tool, and JSOL's leading motor simulation technologies.

JMAG's unique high-speed technologies and modeling technologies were showcased at our booth, attracting a lot of attention. Many people gathered to watch our live demonstration, showing how JMAG can be understood in just 5 minutes. Being able to perform calculations on motor properties in just 5 minutes was fascinating.

Furthermore, one of the walls of the booth was used as a display to show case examples of analyses performed in JMAG. We were so pleased to see engineers hunkered down and really getting into the case examples.

We plan to bring you an even more powerful JMAG next year, so we hope to see you at our booth!

(Tomomi Igarashi)



## Electric Device Design for Multiphysics Structure, Fluid, Magnetic Field Solutions Seminar

A seminar pertaining to multiphysics was held.

### Conference Outline

Host: JSOL Corporation

Date: Thursday, July 31st, 2014

Venue: TRUST CITY CONFERENCE MARUNOUCHI (Tokyo, Japan)

URL: <http://www.jmag-international.com/jp/seminar/op/multiphysics.html> (Japanese only)

A multiphysics solutions seminars was held, demonstrating CAE software integration of three cooperating companies for JMAG's multiphysics simulation.

The hardest part about multiphysics coupled analysis is the gap between the tools. With this shared awareness, we presented tips on how to fill this gap, contributing to a solution to solve this problem, based on our actual experience.

The presentation showed methods and tips on handling data between two or three companies, mixed in with use cases. We hoped that we provided some useful hints for the users who joined our presentation.

A social hour was held after the presentation, and participants could talk with the engineers from each company, and of course with each other as well. Participants had enthusiastic discussions concerning how to solve current issues, operation tips, and to what extent analysis will be necessary in the future.

JMAG will continue to pour more of our energy into multiphysics. Please look forward to our future activities.

(Tomomi Igarashi)



## JMAG Users Conference in Taiwan

A JMAG users conference was held.

### Conference Outline

Host: FLOTREND CORPORATION

Date: Tuesday August 19th, 2014

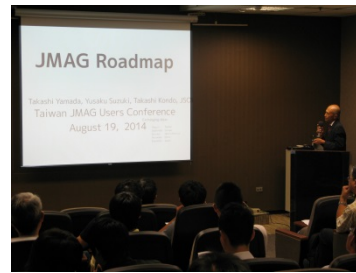
Venue: GIS NTU Convention Center (Taipei ,Taiwan)

URL: [http://www.flotrend.com.tw/news\\_center/event/seminar/2014/08\\_jmag/](http://www.flotrend.com.tw/news_center/event/seminar/2014/08_jmag/) (Chinese only)

We participated in the 2014 JMAG Users Conference in Taipei, Taiwan. JSOL's own Mr. Yamada presented a roadmap for JMAG. Flotrend, a distributor for JMAG, demonstrated how to design a motor using JMAG-Express, and introduced JMAG-Designer Ver.13.1. For the user presentations, The Electric Motor Technology Research Center (EMTRC) introduced analysis examples for Flux Switching PM and SynRM. The Metals Industry Research and Development Center (MIRDC) presented on magnetization analysis and the analysis of magnet characteristics after magnetization, and on comparing actual measurements. China Steel presented on IPM motor analysis, accounting for product degradation due to magnetic steel sheet punching. Kao Yuan University presented examples for optimizing PM linear motors. Taiwan University of Science & Technology presented on small scale generators.

Even during break times, the technical discussions never ceased.

(Yusaku Suzuki)



## 2014 Japan Industry Applications Society Conference

A booth will be open.

### Conference Outline

Host: Industry Applications Society Conference secretariat

Date: Tuesday, August 26th - Thursday, Thursday, August 28th

Venue: Tokyo Denki University Tokyo Senju Campus (Tokyo, Japan)

Booth number: 8

URL: <http://www.gakkai-web.net/gakkai/jjasc/hp14/> (Japanese only)

We participated in the Japan Industry Applications Society Conference business exhibition. As well as academic societies, those involved in research and development, and university professors and students also joined.

It may be due to having our booth located close to the entrance this year, we had many more visitors than usual. We presented a wide range of uses for designing electric devices in JMAG and provided many examples.

There were exhibitions for companies connected to HILS and SILS, and JMAG-RT was introduced. It may be because of this, we received a high volume of questions regarding JMAG-RT. We felt there was a strong interest.

(Yusaku Suzuki)



## Seminar on high-speed calculations using cloud-based electromagnetic analysis

A booth will be open.

### Conference Outline

Host: Fujitsu, JSOL Corporation

Date: Thursday, August 28th, 2014 (Thursday)

Venue: Fujitsu Trusted Cloud Square (Tokyo, Japan)

URL: <https://seminar.jp.fujitsu.com/public/seminar/view/2466> (Japanese only)




Fujitsu and JSOL Corporation held a seminar discussing the cloud.

Designated for the users, JMAG's high speed solver, JMAG-SMP, MPP, and examples using the GPU for high-speed calculations were presented. Furthermore, a report of operating on TC Cloud, and scalability by using parallelization was shown.

During the seminar, two laptops using the cloud were used for live mode; we hope that the participants were able to have a clear image of how this can actually be utilized. JMAG continues to discuss providing cloud technologies.

(Yusaku Suzuki)

This issue has focused largely on reporting exhibitions and seminars. JMAG will continue to strive to not only provide technological support, but also to play a part in our customers' global strategy. 



Author: Tomomi Igarashi



