New Features of JMAG

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New Features of JMAG

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Contents

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- This seminar introduces the new and enhanced features built into JMAG-Designer 10.4 (released 2010/12)

	New features	Enhanced features
Modeling	**Mesh Morphing (2D/3D)** **Defeaturing (2D/3D)**	**Geometry editing features** **Layered mesh** **Mesh modeling the skin effect that accounts for the cross-section**
Analysis	**Analysis using frozen permeability** **High-speed iron loss calculation of magnets for rotating machines** **Electric field analysis study**	**Section analysis study**
Linking	**Abaqus Link** **LMS Virtual.Lab Link**	**Providing an interface for job management systems**

Mesh Morphing (2D/3D)

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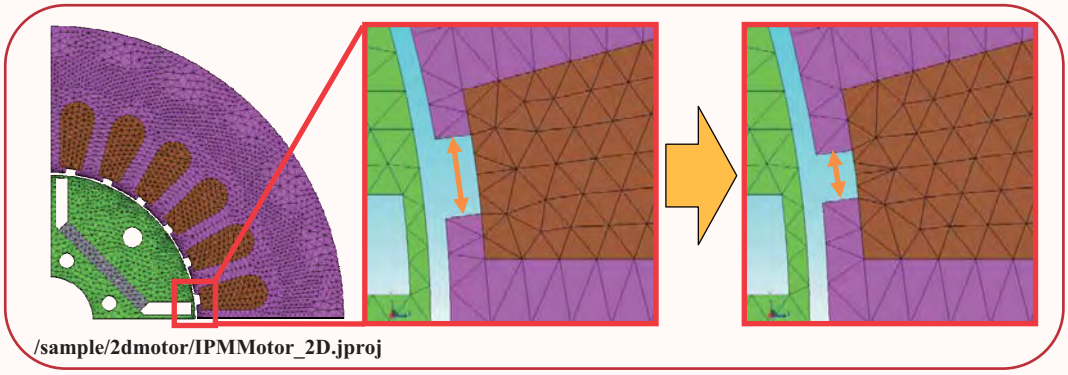
Demonstration | New features

Designer

- Small geometry changes can be applied directly to mesh models.
  - The original geometry does not need to be edited.
  - The mesh does not need to be re-generated.
    - The affects of the mesh on analysis results when making small geometrical changes can be reduced.
  - Both 2D/3D mesh models are supported.



/sample/2dmotor/IPMMotor_2D.jproj

Defeaturing (2D/3D)

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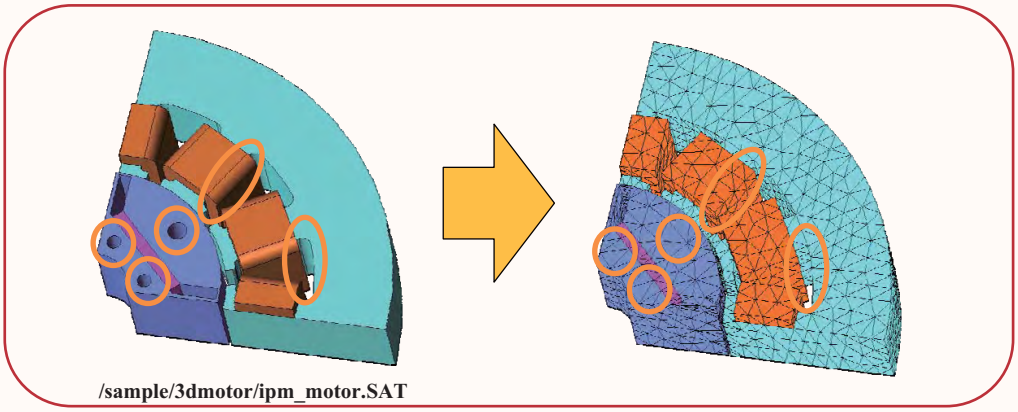
Demonstration | New features

Designer

- The mesh can be automatically generated by simplifying the geometry of models.
  - The original geometry does not need to be edited.
  - Holes, fillets, and chamfers can be defeatured.
  - Both 2D/3D models are supported.



/sample/3dmotor/ipm_motor.SAT

Analysis Using Frozen Permeability

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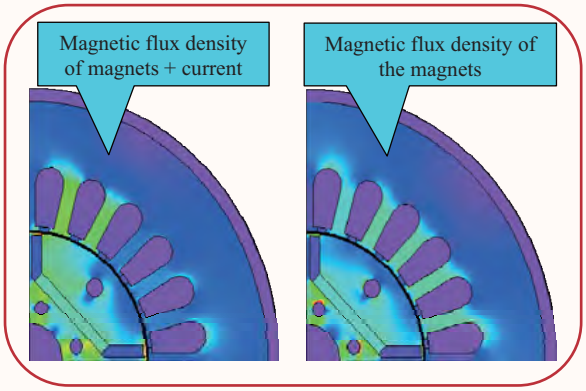
New features

Designer

- The magnetic characteristics of materials that are identified can be fixed, and then an analysis can be performed.
  - The magnetomotive force for the magnet and current can be isolated and evaluated.
  - The accuracy of inductance has improved by taking into account the superimposed direct current of transformer models.



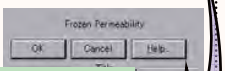
STEP 1 Run a standard magnetic field analysis study

New results type

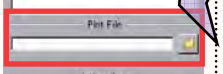
Results including permeability of each element

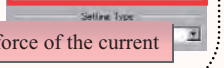
STEP 2 Duplicate the magnetic field analysis study

Change the current value to 0 in the duplicated study



Set the frozen permeability condition (Applies the permeability obtained in STEP 1)





Results isolating the magnetomotive force of the current

High-speed Iron Loss Calculation of Magnets for Rotating Machines

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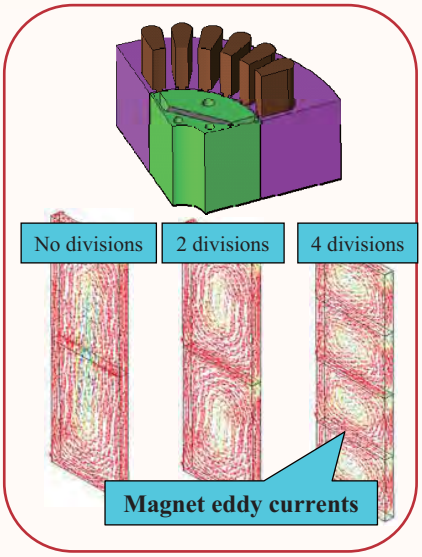
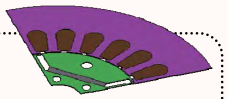
New features

Designer

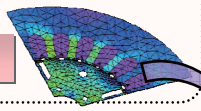
- A high-speed calculation of magnet eddy currents and loss can be performed for 3D rotating machine models using 2D analysis results



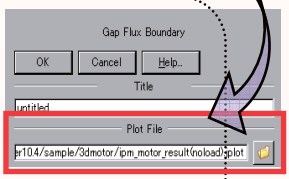
STEP 1 Run a section analysis



Analysis results for the 2D model

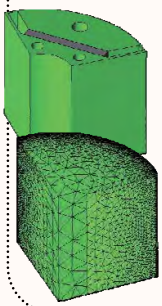


STEP 2 Model only the rotor in 3D



Create a 3D analysis study

Set the gap flux boundary condition



Run the analysis

	Calculation time
3DTR (conventional)	8 hrs
2DTR+new method	**12minutes**

CPU : Pentium4 3.6GHz
RAM: 2GB

Electric Field Analysis Study

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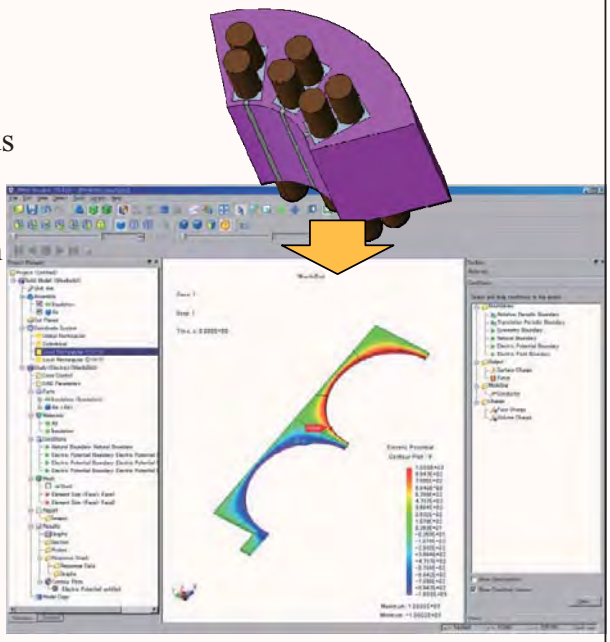
New features

Designer

- Electric field analysis can now be performed for solid models.
  - Supports static, frequency response, and current distribution analyses
  - Supports material settings for electric fields
  - Provides an insulation condition
    - Does not require shell elements for insulation
  - Provides a translation periodic boundary
  - Supports solid modeling for setting electric potential at points
    - Create a point on solid model faces



Linking to Abaqus/LMS

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New features

Designer

Studio

Abaqus Link

- Magnetic field analysis results (Joule loss/iron loss)
- Magnetic field analysis results (electromagnetic force)
- Magnetic field analysis

- Thermal analysis
- Structural analysis
- Structural analysis results (stress)

SIMULIA ABAQUS

- The analysis results obtained in JMAG can be applied to Abaqus analysis models.
- The analysis results obtained in Abaqus can be applied to JMAG analysis models.

LMS Virtual.Lab Link

LMS ENGINEERING INNOVATION

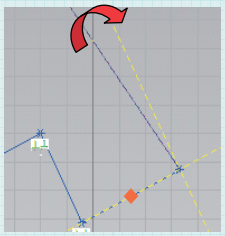
- The analysis results (electromagnetic force) obtained in JMAG can be applied to LMS analysis models.

Geometry Editing Features

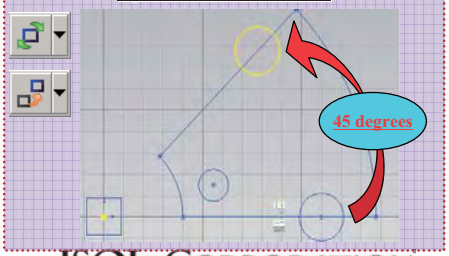
Demonstration | Enhanced | Designer

- Features have been added or enhanced for creating sketches.
  - Snapping to right angles of auxiliary lines
  - Enabling/disabling snapping
    - The snapping feature can be finely tuned.
  - Enable/disable automatic constraints
  - Rotating/moving geometry a specified distance
  - Save geometry being edited
    - Save geometry data that doesn't have regions/solids

Snap to right angles of auxiliary lines



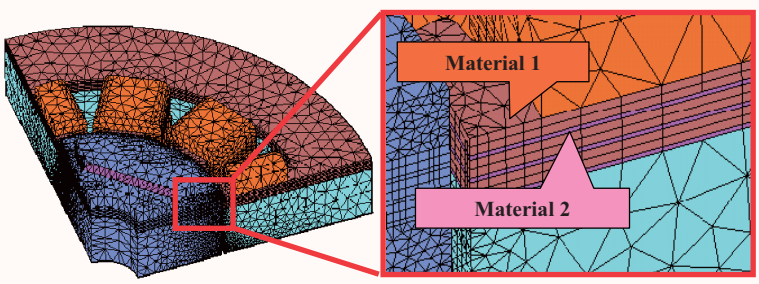
Rotating/moving geometry a specified distance



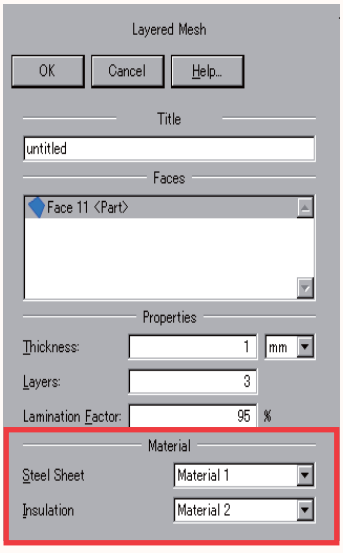
Layered Mesh

Enhanced | Designer

- Mesh for laminated steel sheets can be generated easily using the layered mesh feature.
  - The materials for the layers of electromagnetic steel and insulation for the layered mesh to automatically generate can now be specified.



/sample/3dmotor/ipm_motor.SAT



Materials for layered mesh are registered directly in [Materials] under [Study] in the treeview.

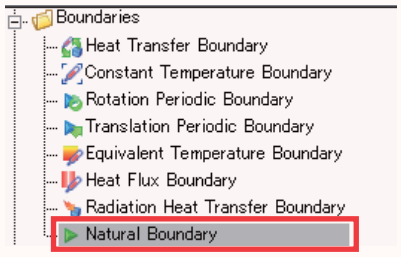
Mesh Modeling the Skin Effect Accounting for the Cross-Section

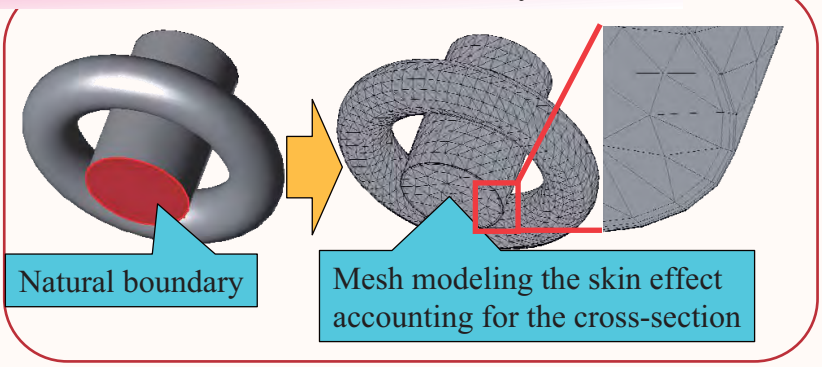
JMAG Enhanced Designer

- Mesh modeling the skin effect can now be generated taking into account the cross-section in thermal analysis studies.

·Mesh modeling the skin effect can be used for analyses that don't require air regions, such as thermal analyses
·Mesh modeling the skin effect could not be generated taking into account the cross-section because the cross-section could not be specified.

The natural boundary condition has been added to thermal analysis studies

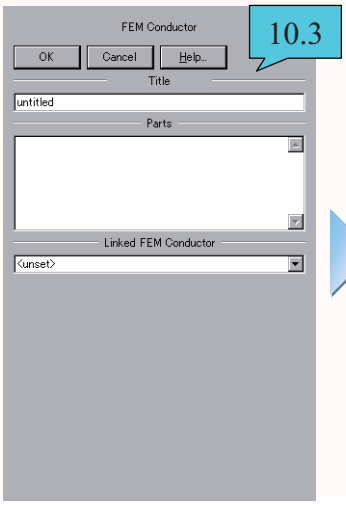


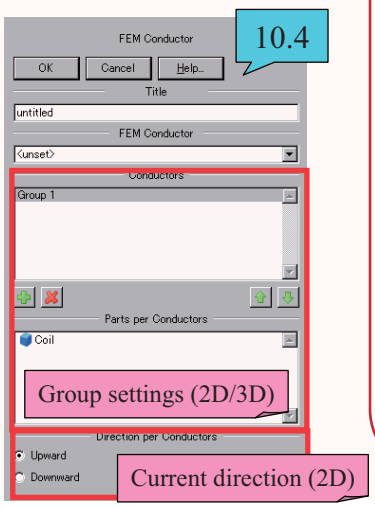


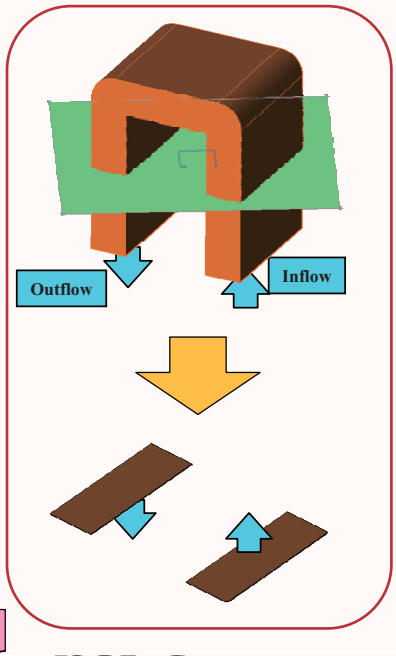
Section Analysis Study

JMAG Enhanced Designer Studio

- FEM conductor conditions can now be maintained for section analyses
  - The way to set the FEM conductor has changed
    - Supports group settings (2D/3D)
    - The direction of current can now be set (2D)







Providing an Interface for Job Management Systems

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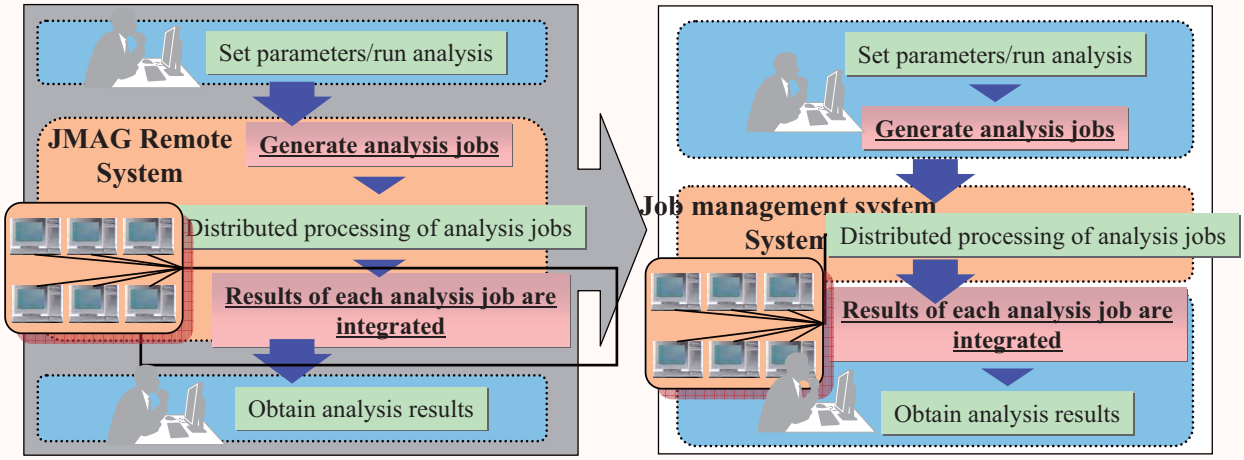
Enhanced

Designer Studio

- JMAG now offers analysis features to generate multiple analysis jobs internally.
  - RT, inductance analysis, and snapshot analysis
- The interface of the analysis program has been upgraded to run analysis jobs generated internally using a job management system



Conclusion

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- JMAG continually strives to develop new analysis features and enhance existing features to offer solutions to the technical challenges of product development.
- Your feedback is invaluable to the development of JMAG
- For a more thorough overview, please contact us!

Contact

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