

Advanced simulation of internal flow in rotating machinery

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● Responsible Representative

Tatsuya Ishii, Aeronautical Technology Directorate, Propulsion Research Unit

● Contact Information

Junichi Kazawa, Aeronautical Technology Directorate, Propulsion Research Unit(kazawa.junichi@jaxa.jp)

● Members

Junichi Kazawa, Takahiro Kawahara

● Abstract

Implement LES and DES in the rotating coordinate system to improve the aerodynamic performance prediction accuracy of rotating machine like fan, compressor, and so on, flows by numerical simulation.

● Reasons and benefits of using JAXA Supercomputer System

LES and DES for rotating machines have a huge number of grid points and a high computational load. For this reason, calculations cannot be performed without JSS2.

● Achievements of the Year

DES analysis was performed on the centrifugal compressor. It was confirmed that fine vortices can be captured by using a scheme with weak numerical viscosity.

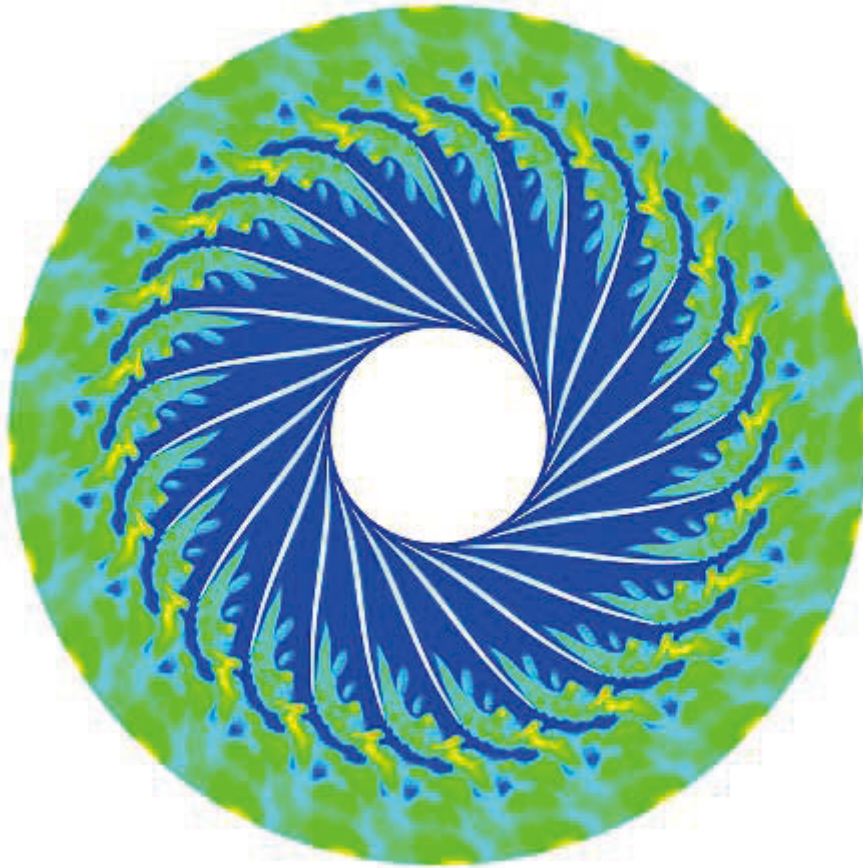


Fig. 1: Centrifugal compressor internal flow (entropy distribution)

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	Automatic Parallelization
Number of Processes	64 - 106
Elapsed Time per Case	100 Hour(s)

- **Resources Used**

Fraction of Usage in Total Resources*¹(%): 0.03

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage* ² (%)
SORA-MA	0.00	0.00
SORA-PP	85,292.20	0.55
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage* ² (%)
/home	10.04	0.01
/data	958.69	0.02
/tmp	2,055.92	0.17

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	0.00	0.00

*¹: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*²: Fraction of Usage : Percentage of usage relative to each resource used in one year.