

Improvement of numerical analysis for internal flow with complicated configuration inside aero-engine

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● Abstract

Unstructured-grid flow solver FaSTAR-Move and grid generator BOXFUN are applied to aero-engine elements with complicated configuration (such as linear and rotating cascades). Through the calculation, these programs are tested and investigated for the deficiency and future issue for improvement of accuracy.

● Reasons for using JSS2

Aiming to do large scale calculation in the future, programs should be tested under the same computational environment.

● Achievements of the Year

Steady Reynolds averaged Navier-Stokes (RANS) calculations were performed for the transonic compressor, Rotor 67 and the cooled turbine cascade, T106A using FaSTAR-Move. The converged solutions has been obtained and validated.

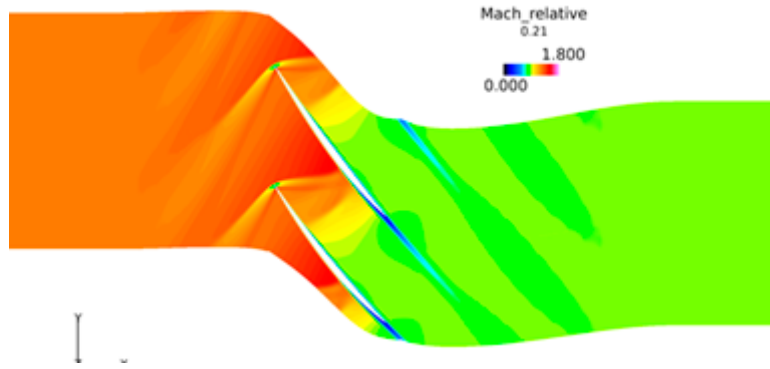


Fig. 1: Mach number distribution on a blade-to-blade surface in Rotor67 transonic compressor

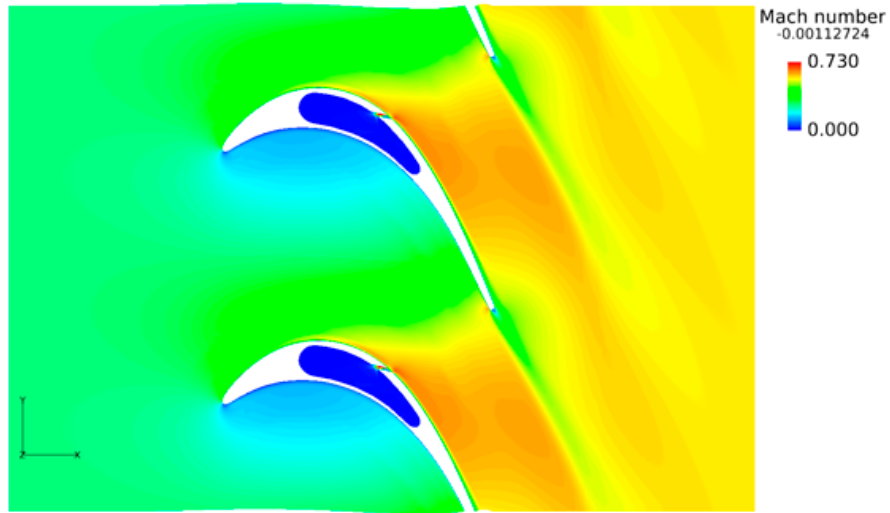


Fig. 2: Mach number distribution on a blade-to-blade surface in T106A turbine cascade

- **Publications**

N/A

- **Usage of JSS2**

- **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	16 - 512
Elapsed Time per Case	12 Hour (s)

- **Resources Used**

Fraction of Usage in Total Resources*¹ (%): 0.11

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage* ² (%)
SORA-MA	859,332.27	0.11
SORA-PP	3,785.42	0.03
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	162.23	0.17
/data	22,808.39	0.40
/tmp	4,858.74	0.42

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	9.64	0.34

*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.