

Research on engine intake simulation

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Subject Category: Skills Acquisition System

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● Abstract

This project aims to verify the validity of FaSTAR for internal flow simulations.

● Reasons for using JSS2

The reason for using JSS2 is to accelerate the RANS simulation on relatively large computational grids to enhance research activities.

● Achievements of the Year

We conducted RANS simulations of the S-shape duct which is one of the benchmark problem of AIAA Propulsion Aerodynamics Workshop (PAW). We compared the numerical results (TPR, DPCP) obtained by FaSTAR and other CFD results from PAW and confirmed that FaSTAR could be applied to the simulation of internal flow.

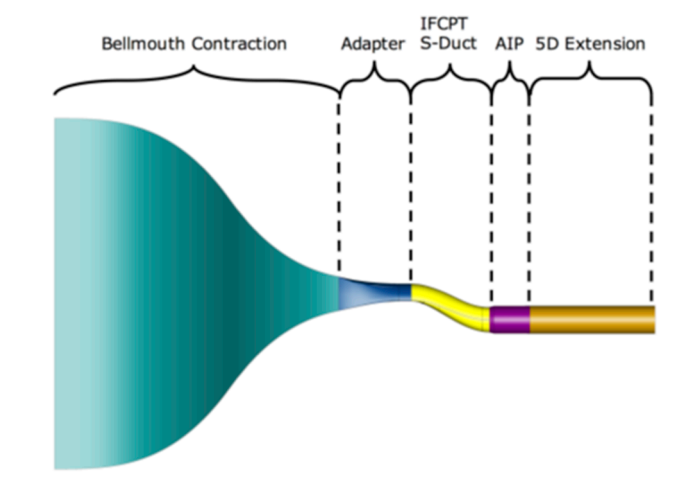


Fig. 1: Geometry of S-shape duct

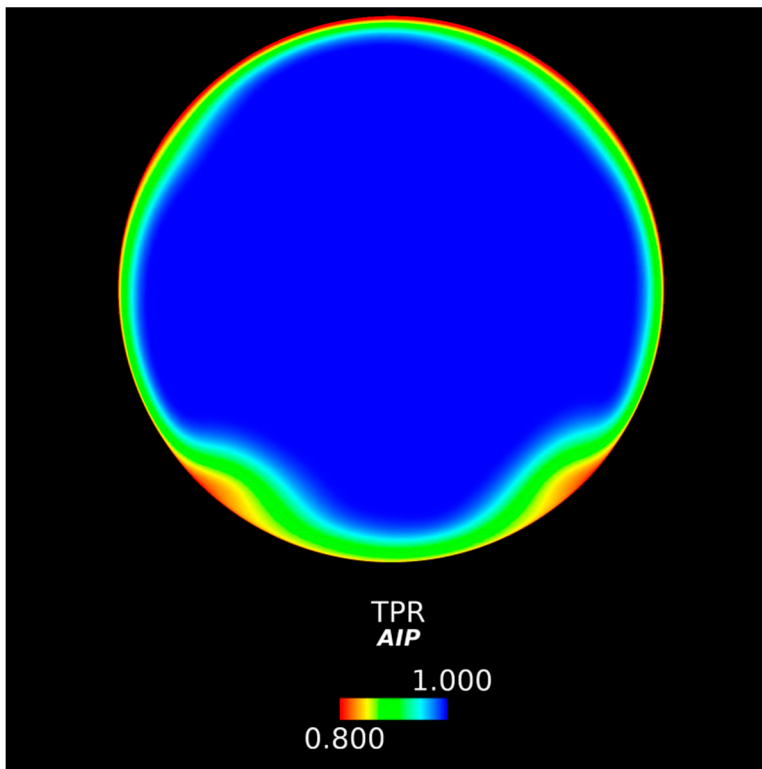


Fig. 2: Total pressure distribution at AIP surface

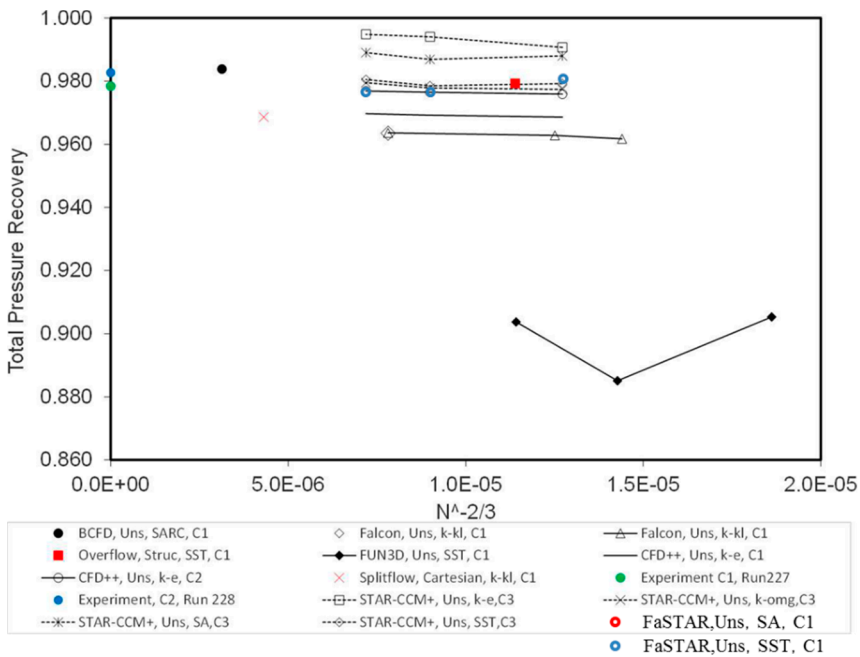


Fig. 3: Comparison of Total Pressure Recovery

● Publications

N/A

- Usage of JSS2

- Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	256 - 1024
Elapsed Time per Case	20 Hour (s)

- Resources Used

Fraction of Usage in Total Resources*1 (%): 1.22

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	10,765,778.20	1.32
SORA-PP	42,666.95	0.34
SORA-LM	20,589.88	9.60
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	491.14	0.51
/data	31,250.01	0.55
/ltmp	4,882.81	0.42

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	1.78	0.06

*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.