

High-Reynolds number stall characteristics of a wing-body configuration model

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● Abstract

Aerodynamic characteristics of a fundamental wing-body configuration model was analyzed by CFD to compare with High-Reynolds number wind tunnel data conducted in JAXA's TWT2.

● Reasons and benefits of using JAXA Supercomputer System

JSS3 was used to conduct AoA sweep CFDs of 3-dimensional model. Its abilities of parallel processing and many CFD cases were necessary to conduct CFD in this research.

● Achievements of the Year

We evaluated the effects of wall interference in wind tunnel tests using a fundamental wing-body model. It was confirmed that the stall angle decreases due to flow field interference with the wind tunnel side walls (walls in the span direction).

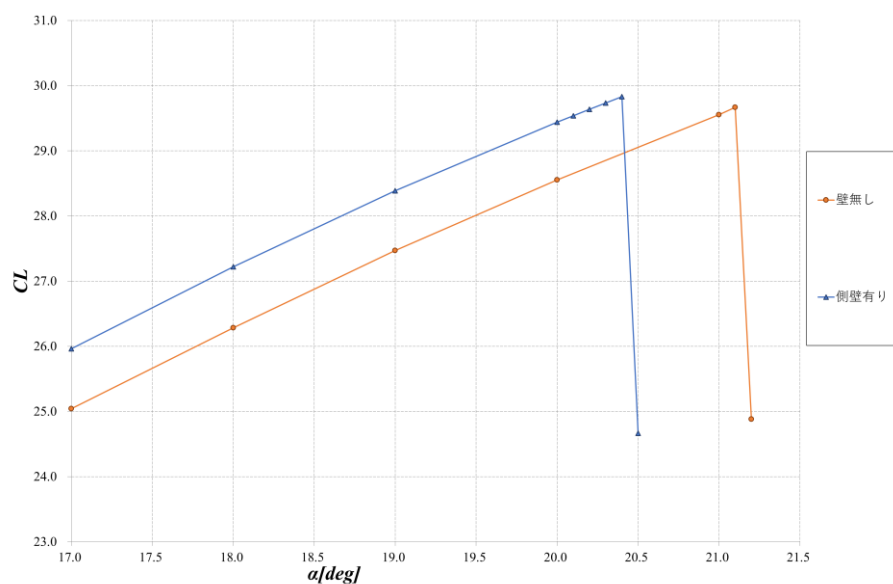


Fig. 1: CL-AoA characteristics of fundamental wing-body model: Stall angle of attack had a difference of about 0.5 degrees whether there is a wind tunnel wall or not. The results with side walls were closer to the experimental results.

● Publications

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	960
Elapsed Time per Case	2.5 Hour(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.08

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	2,002,617.69	0.09
TOKI-ST	33,059.12	0.04
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	34.82	0.03
/data and /data2	105,848.99	0.65
/ssd	295.30	0.03

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	4.21	0.02

*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.

- **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage ^{*2} (%)
ISV Software Licenses (Total)	194.87	0.09

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