

Study on multi-dimensional time series data analysis

Report Number: R20EDA201N04

Subject Category: Aeronautical Technology

URL: <https://www.jss.jaxa.jp/en/ar/e2020/14309/>

● Responsible Representative

Takashi Aoyama, Aeronautical Technology Directorate, Numerical Simulation Research Unit

● Contact Information

Aeronautical Technology Directorate, Numerical Simulation Research Unit(ohmichi.yuya@jaxa.jp)

● Members

Yuya Ohmichi, Keita Nakamoto, Mami Hayakawa, Kento Yamada, Katsuhito Kozawa, Kohmi Takahashi, Kazuyuki Itoh

● Abstract

Knowledge extraction techniques for large datasets are important because the computers and numerical simulation techniques have been highly developed and they produced huge datasets. In this study, we have been developing knowledge extraction tools which extract patterns from large data sets obtained by unsteady fluid simulations.

● Reasons and benefits of using JAXA Supercomputer System

To perform feature extraction analysis utilizing the large scale memory of LM node, and massively parallel analysis using MA nodes.

● Achievements of the Year

We analyzed fluid structures in the low-speed flow around a commercial plane was carried out. In addition, steady and unsteady fluid simulations for predicting high-speed buffet phenomena were also conducted, and a buffet prediction model was investigated based on the obtained data.

● Publications

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	OpenMP
Number of Processes	1 - 480
Elapsed Time per Case	12 Hour(s)

● Resources Used(JSS2)

Fraction of Usage in Total Resources*1(%): 0.06

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2(%)
SORA-MA	196,825.23	0.04
SORA-PP	14,720.54	0.12
SORA-LM	43.23	0.03
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2(%)
/home	475.25	0.44
/data	19,265.50	0.37
/ltmp	6,412.76	0.55

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2(%)
J-SPACE	5.66	0.19

*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.

- **Resources Used(JSS3)**

Fraction of Usage in Total Resources*1(%): 0.18

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	720,230.49	0.15
TOKI-RURI	14,494.94	0.08
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2(%)
/home	576.97	0.40
/data	26,482.91	0.44
/ssd	697.77	0.36

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2(%)
J-SPACE	5.66	0.19

*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.