Numerical analysis on atomization and spray combustion

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● **Abstract**

A numerical study is performed to clarify phenomena on atomization and spray combustion.

● **Reasons and benefits of using JAXA Supercomputer System**

Phenomena on atomization and spray combustion require a high calculation load, and the use of super computer is necessary.

● **Achievements of the Year**

A preliminary investigation on models on the effects of fuel-supply response to oscillating air flows was performed for combustion-oscillation conditions with influence of the downstream duct of the test rig.

As a result, different oscillation modes and their frequencies were observed depending on the response models.
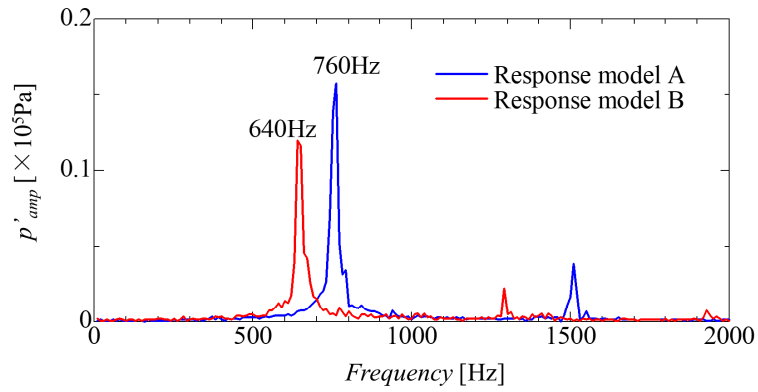
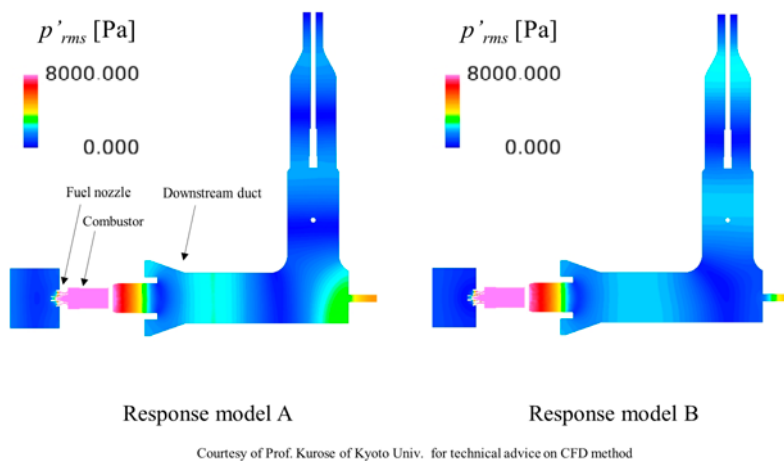Fig. 1: Frequency spectrum of pressure in the combustion chamber.

Fig. 2: Spatial distributions of r.m.s. values of pressure oscillations.

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	512
Elapsed Time per Case	96 Hour(s)

● **Resources Used(JSS2)**

Fraction of Usage in Total Resources[1](%): 0.46

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[2](%)
SORA-MA	2,719,282.99	0.51
SORA-PP	597.48	0.00
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	315.91	0.29
/data	26,369.97	0.51
/ltmp	2,700.34	0.23

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[2](%)
J-SPACE	0.10	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.

- **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	897,540.05	0.19
TOKI-RURI	100.65	0.00
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[2](%)
/home	325.29	0.22
/data	26,633.14	0.45
/ssd	134.42	0.07

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[2](%)
J-SPACE	0.10	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.