

## 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 for using JSS2

In order to analyze a complicated atomization and spray combustion phenomena of a fuel nozzle precisely, we conduct the flamelet combustion analysis using large size of database, and the use of super computer is necessary.

### Achievements of the Year

A numerical simulation on an aero-engine lean-staged fuel injector was performed for a condition at which combustion oscillation was observed in our experiment. It was also observed in the CFD result as shown in the figures below.

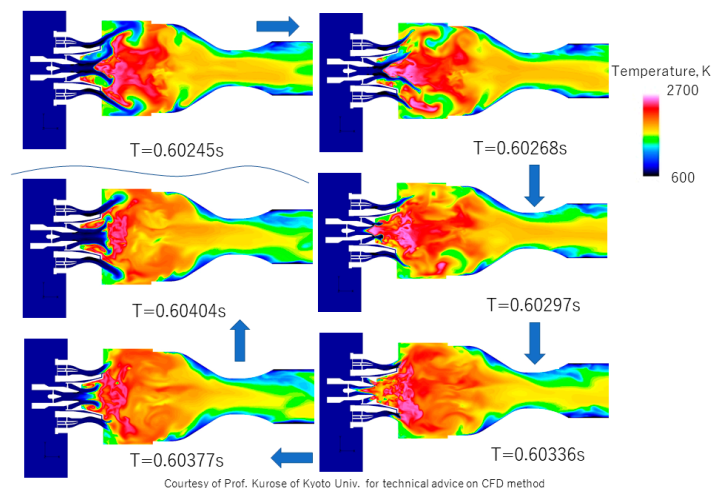


Fig. 1: Time evolution of temperature distribution during an oscillation cycle.

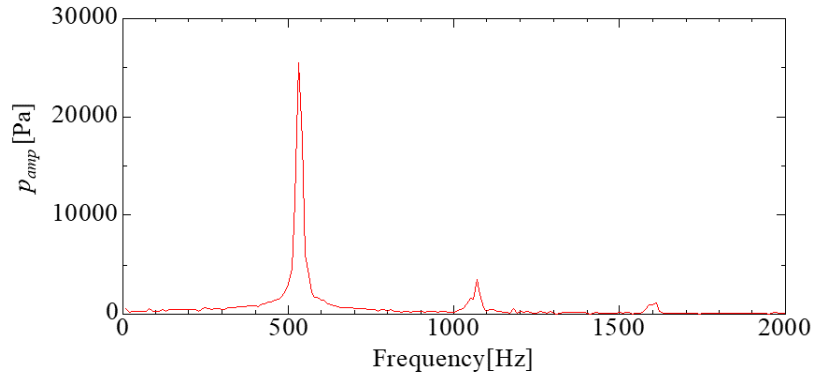


Fig. 2: Frequency spectrum of pressure in the combustion chamber

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	512
Elapsed Time per Case	4 Hour (s)

● **Resources Used**

Fraction of Usage in Total Resources\*<sup>1</sup> (%): 1.78

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage* <sup>2</sup> (%)
SORA-MA	16,276,333.31	1.99
SORA-PP	394.95	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	476.38	0.49
/data	64,798.11	1.14
/ltmp	16,899.19	1.45

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	0.21	0.01

\*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.