
Femtet Benchmark

Intel Xeon E5-2699 v4 (2.20GHz 44 cores)

Memory: 512GB

Femtet version 2016.1.1

- Benchmark Items

- Analysis time
- Efficiency of parallel computing
- Memory usage

- Environment

Machine	DELL PRECISION TOWER 7910
CPU	Intel Xeon E5-2699 v4 2.20GHz 22 cores x 2 processors (total 44 cores) L3 cache 55MB x 2
Memory	512GB DDR4
Graphics	NVIDIA Quadro K620 2GB (for graphics)
HDD	SATA 4TB
OS	Windows 10 Pro 64bit
Femtet	2016.1.1

- Analysis is performed with default settings of Femtet unless specified.
- Matrix solver type is set to [Automatic].
(Cross-reference of analysis conditions and matrix solver types are shown on the following page)
- The analysis results with 64-bit computing are plotted.
- The analysis time and memory usage mentioned in the benchmark are for whole processes including meshing.
- The limit on the analysis time is 96 hours. No analysis is performed beyond 96 hours.
- The results with the 1st-order elements are plotted for reference.
The 1st-order elements enable faster calculation but with lower accuracy.
Therefore the 1st-order and 2nd-order elements cannot be compared simply.
- The analysis results vary depending on the analysis model.
The results are for reference only.
The results may not be obtained as described in this benchmark.

- The matrix solver type is set to [Automatic].
- The benchmarking is conducted based on the cross reference table below.

*For the details of the matrix solver, go to

Femtet Help > Home > How to Set Analysis Condition >

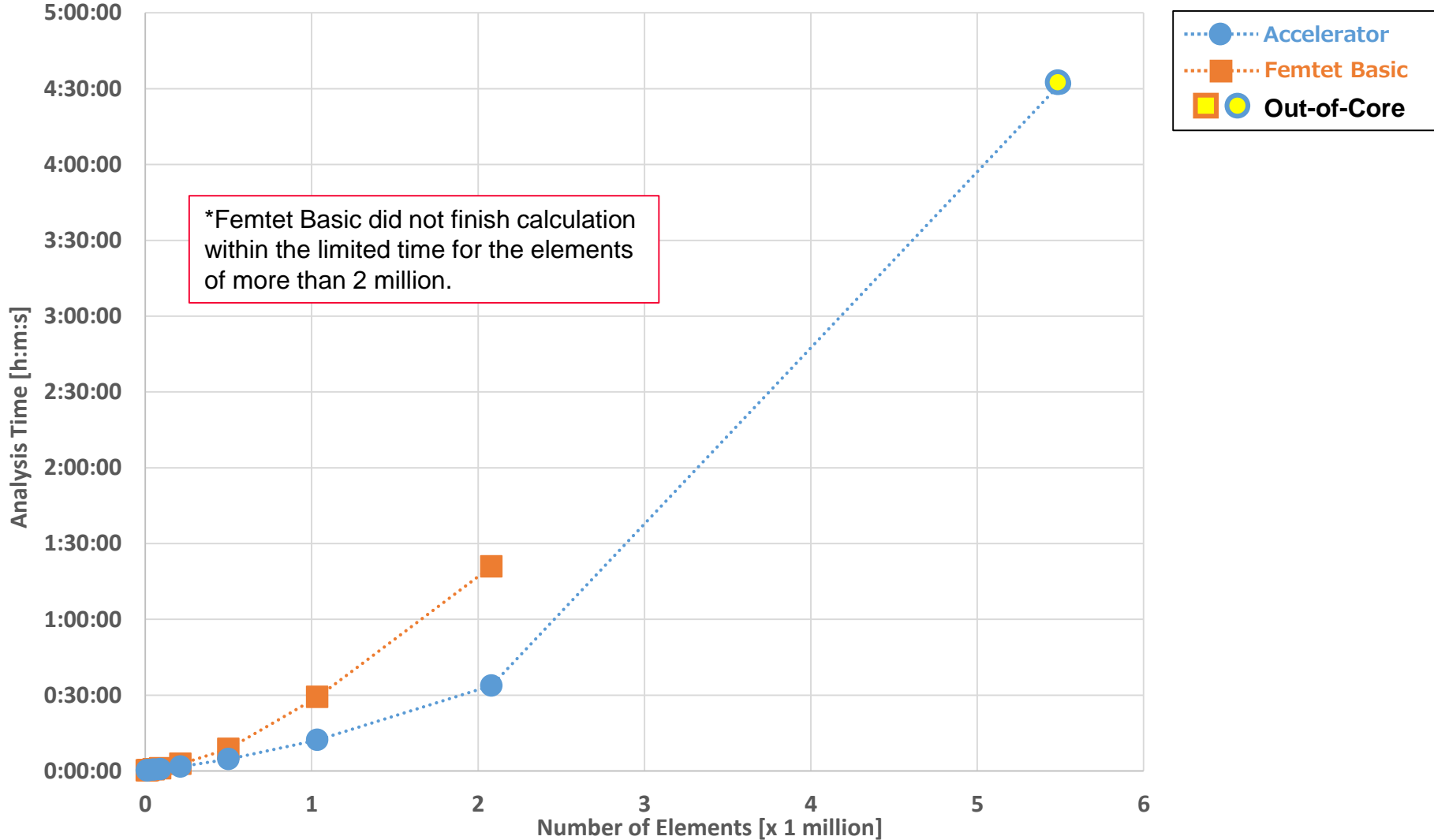
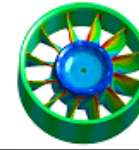
List of Analysis Condition Tabs > High-Level Setting Tab

Analysis Type	Matrix Solver Type
Mechanical Stress	Direct method
Thermal ※without natural convection	Iterative method
Thermal ※with natural convection	Direct method
Electromagnetic	Direct method
Magnetic	Iterative method
Electric	Iterative method
Piezoelectric	Direct method
Acoustic	Direct method

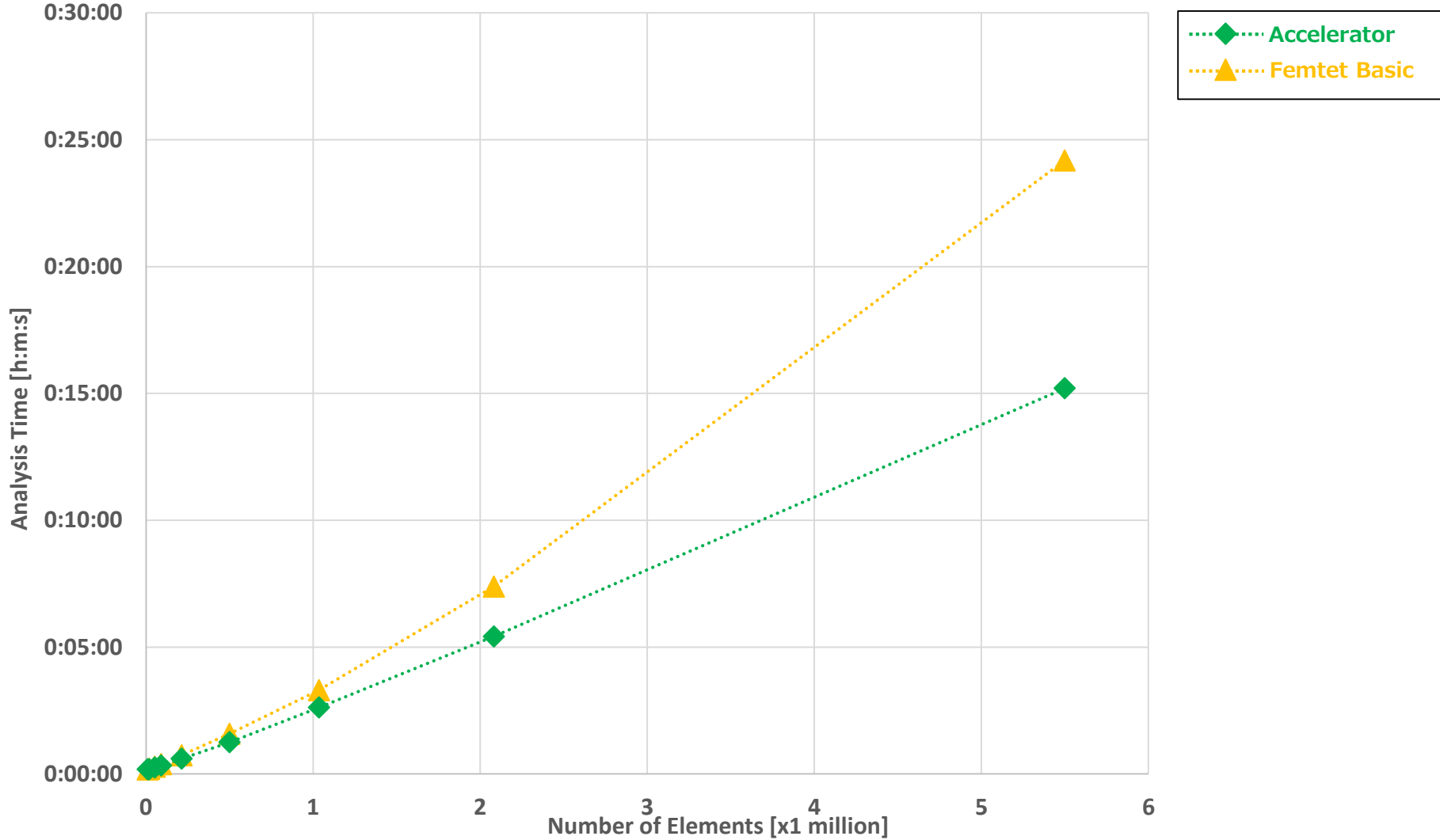
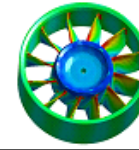
The Number of Elements and Analysis Time

- The measured points for up to 5 million elements are plotted
- Calculation is performed with parallel computing with 44 cores

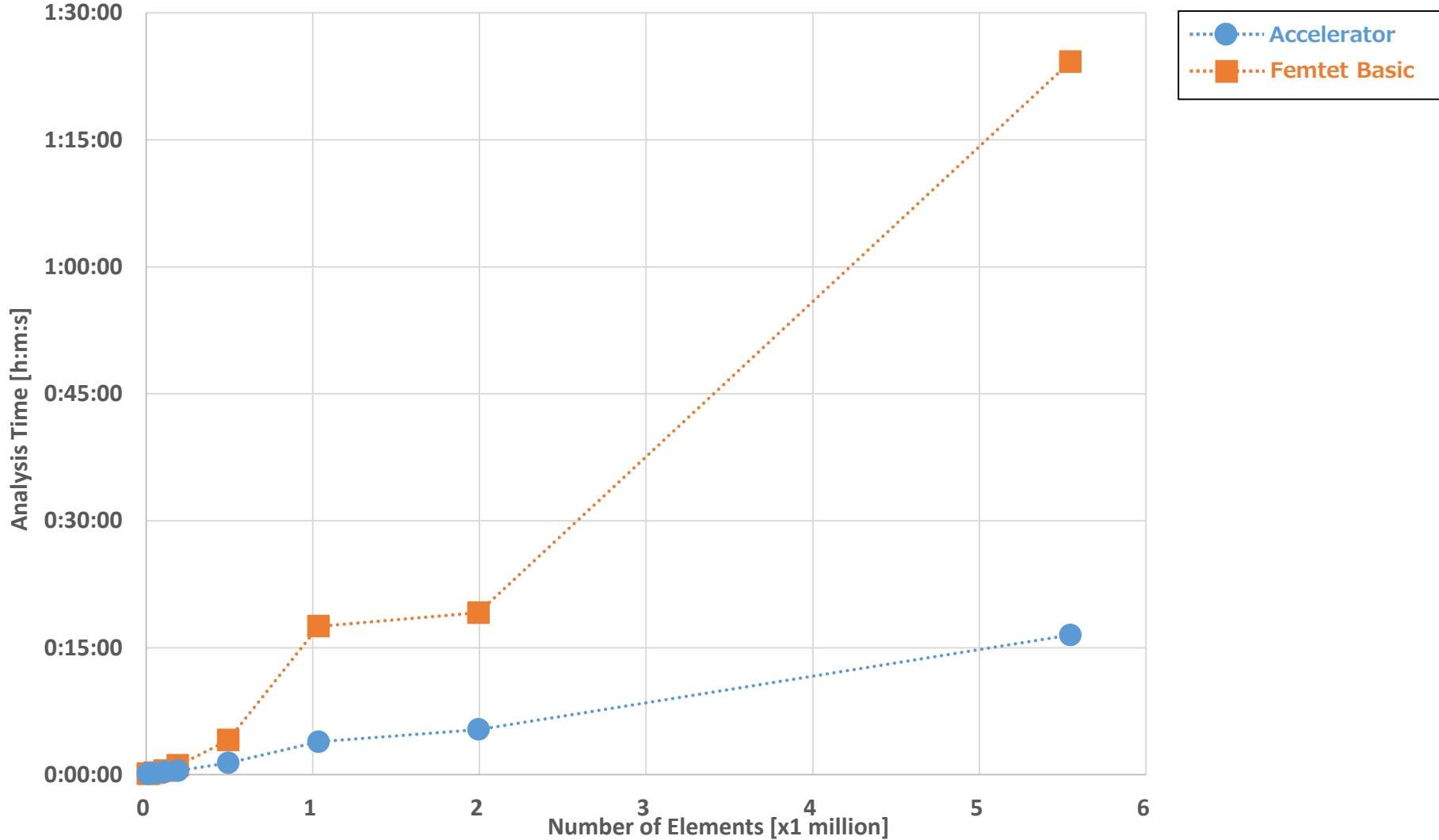
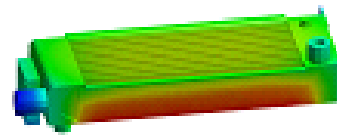
Mechanical Stress (2nd-order Elements)



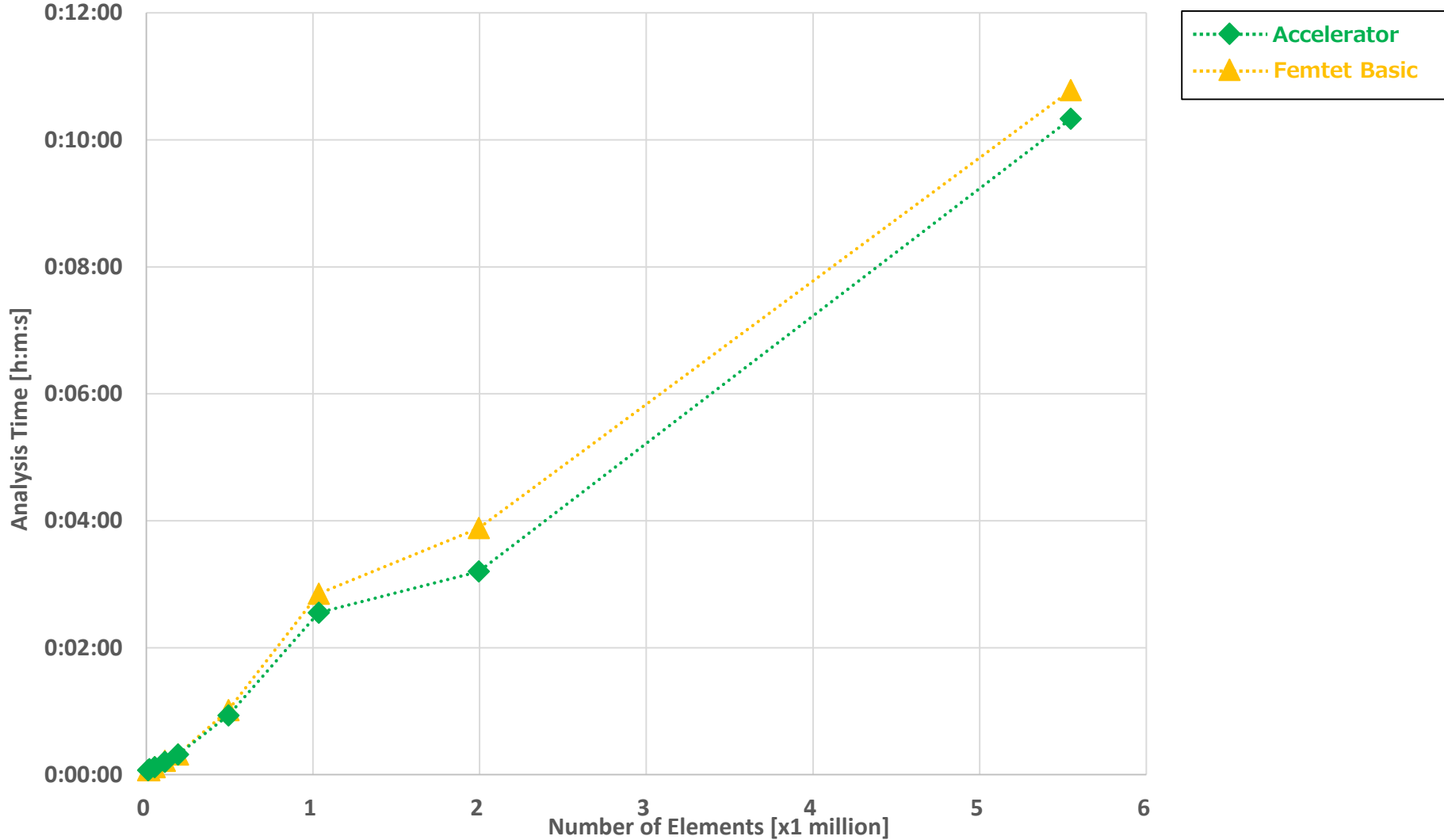
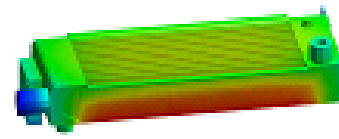
Mechanical Stress (1st-order Elements)



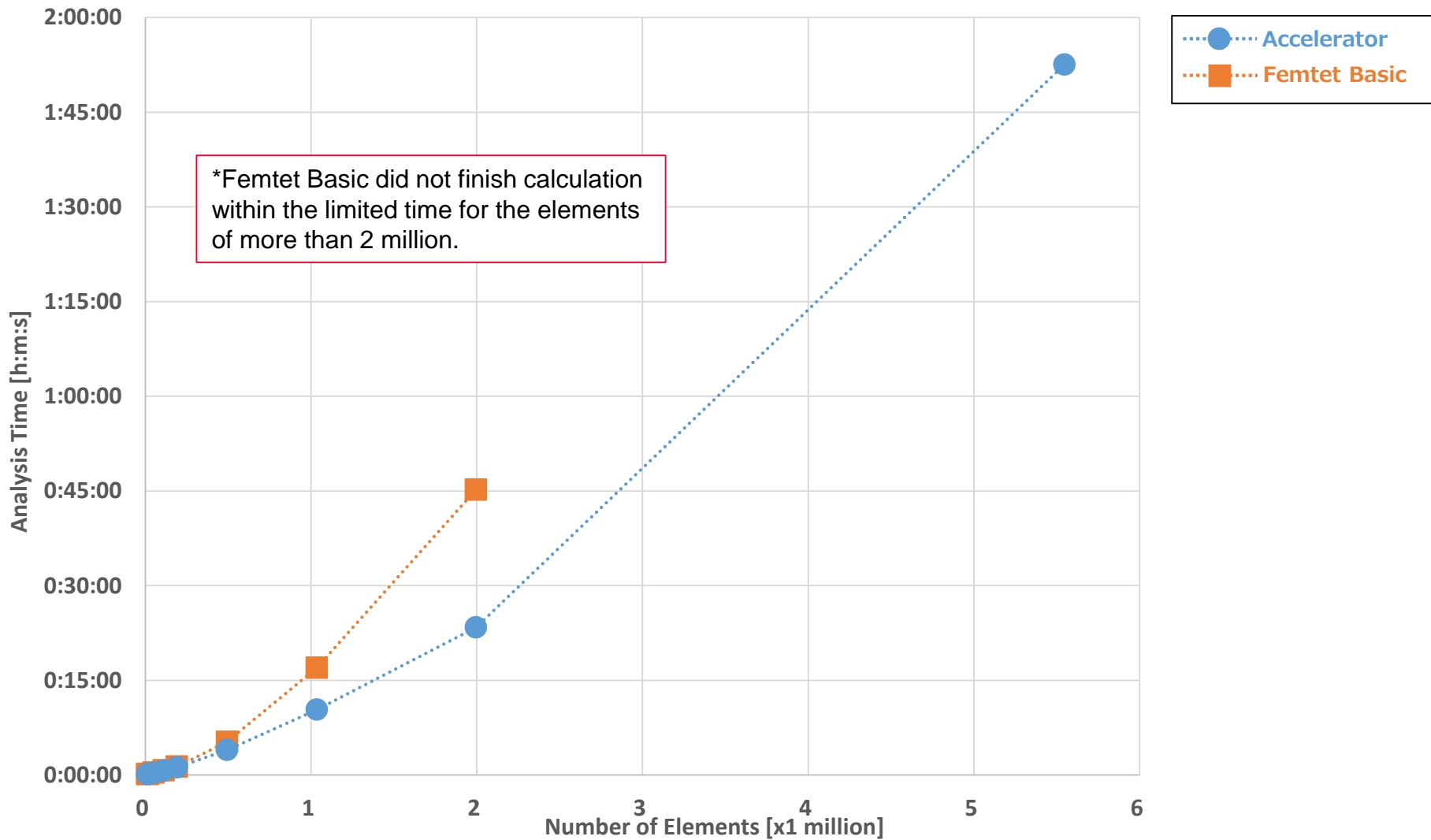
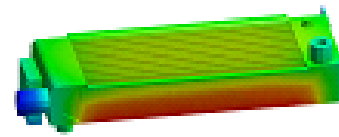
Thermal (2nd-order Elements) without Natural Convection



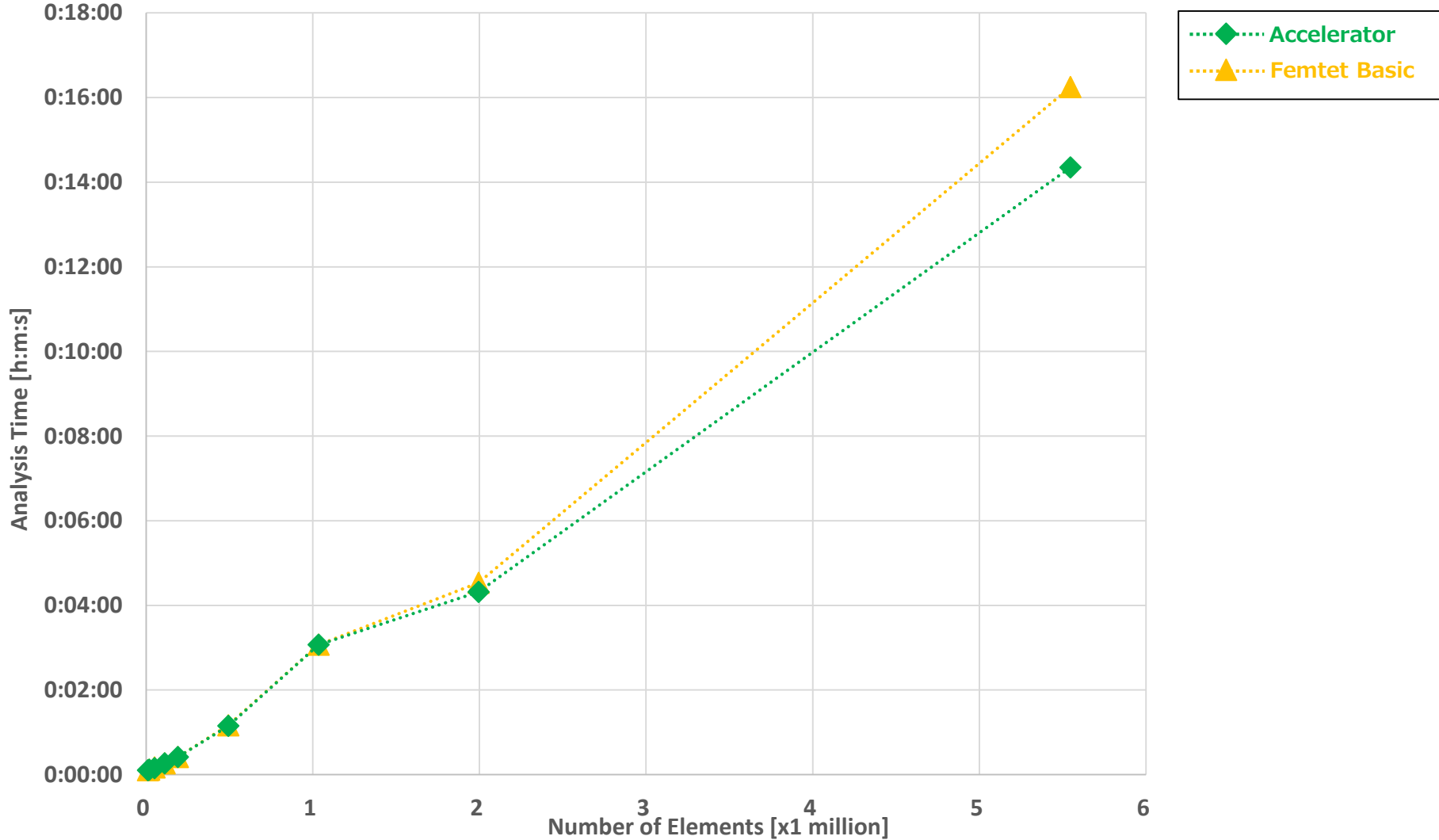
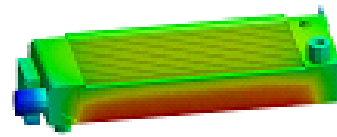
Thermal (1st-order Elements) without Natural Convection



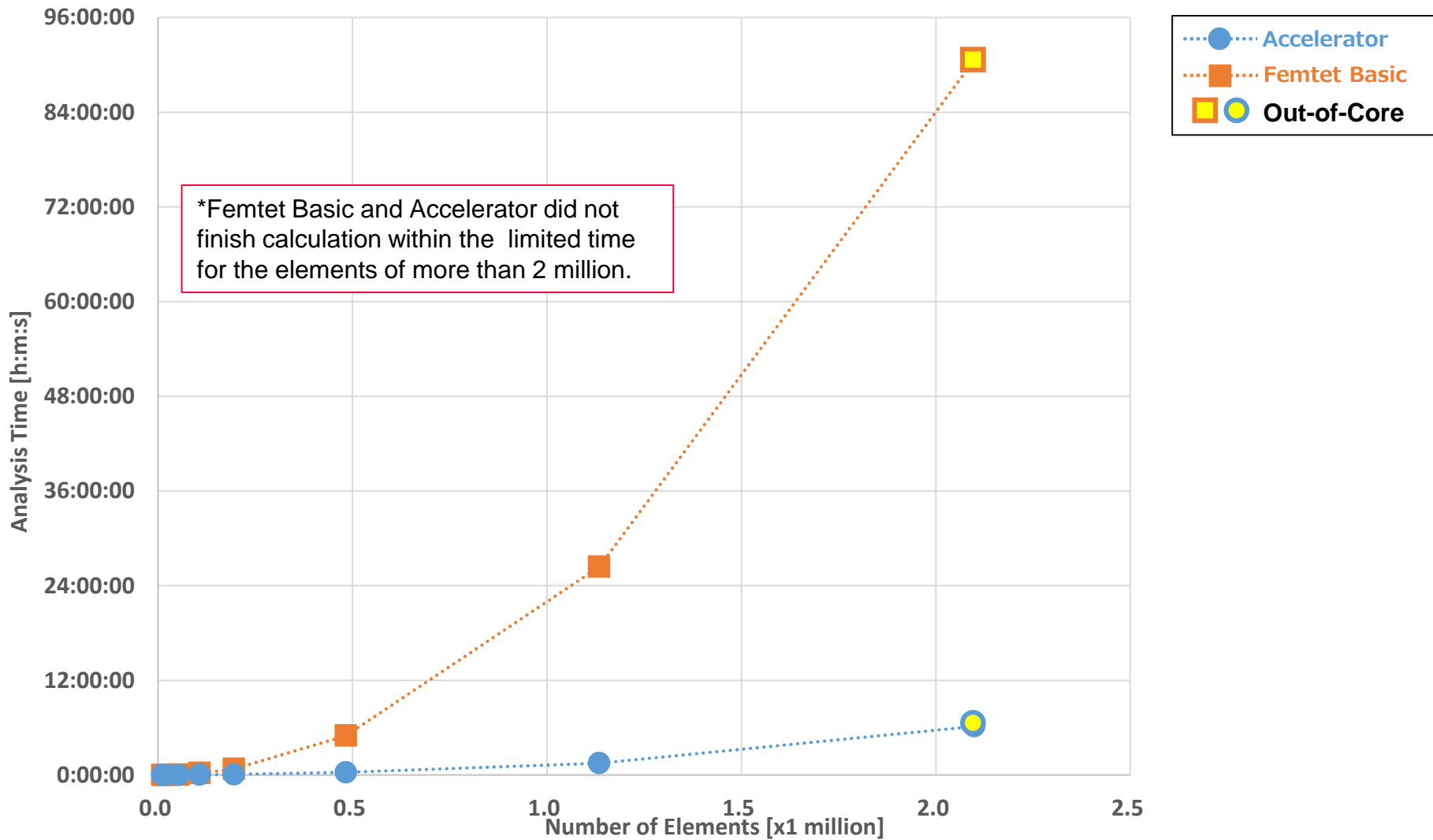
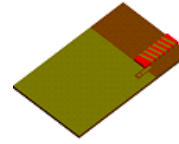
Thermal (2nd-order Elements) with Natural Convection



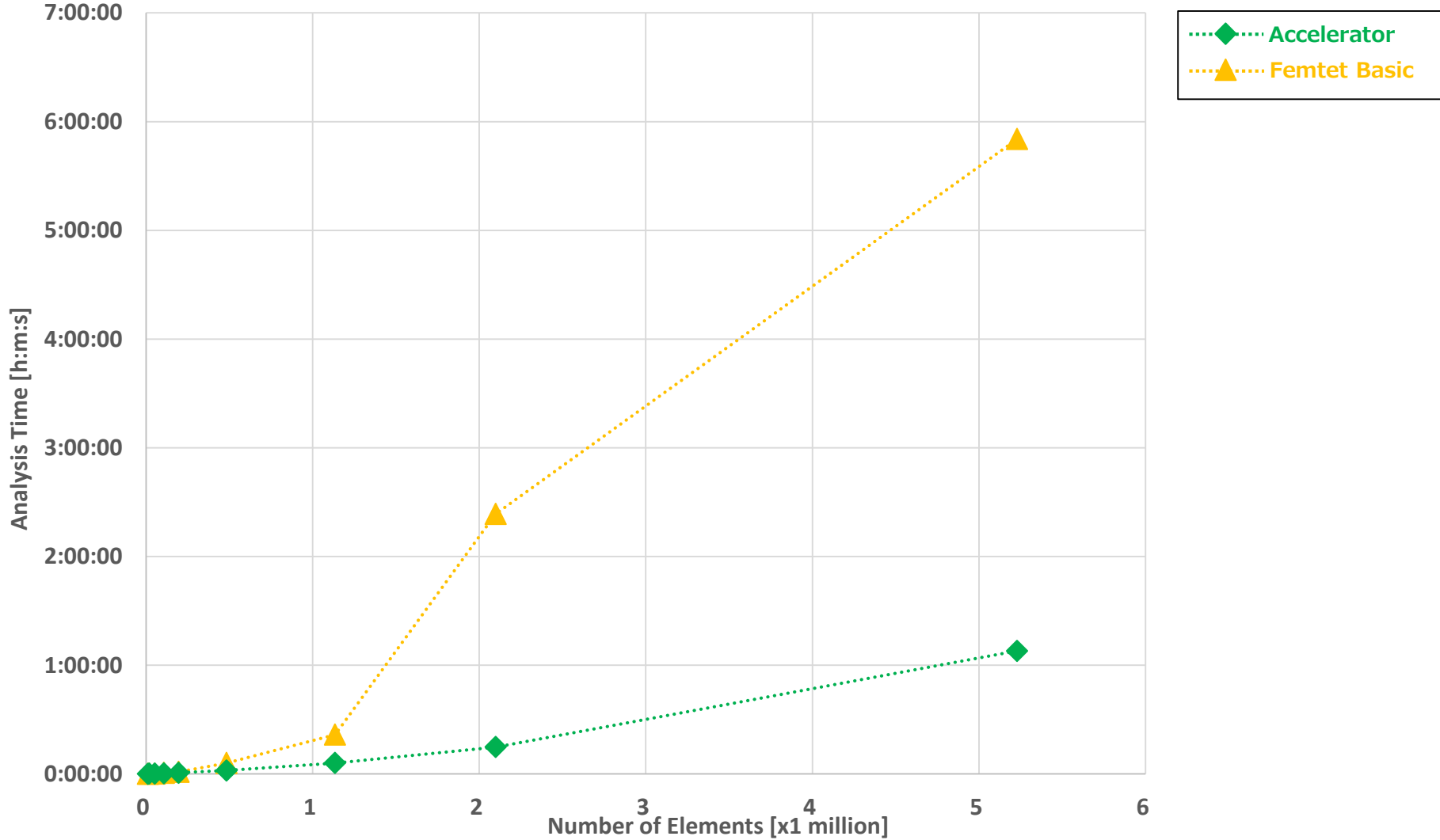
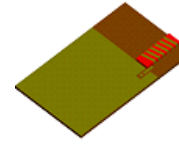
Thermal (1st-order Elements) with Natural Convection



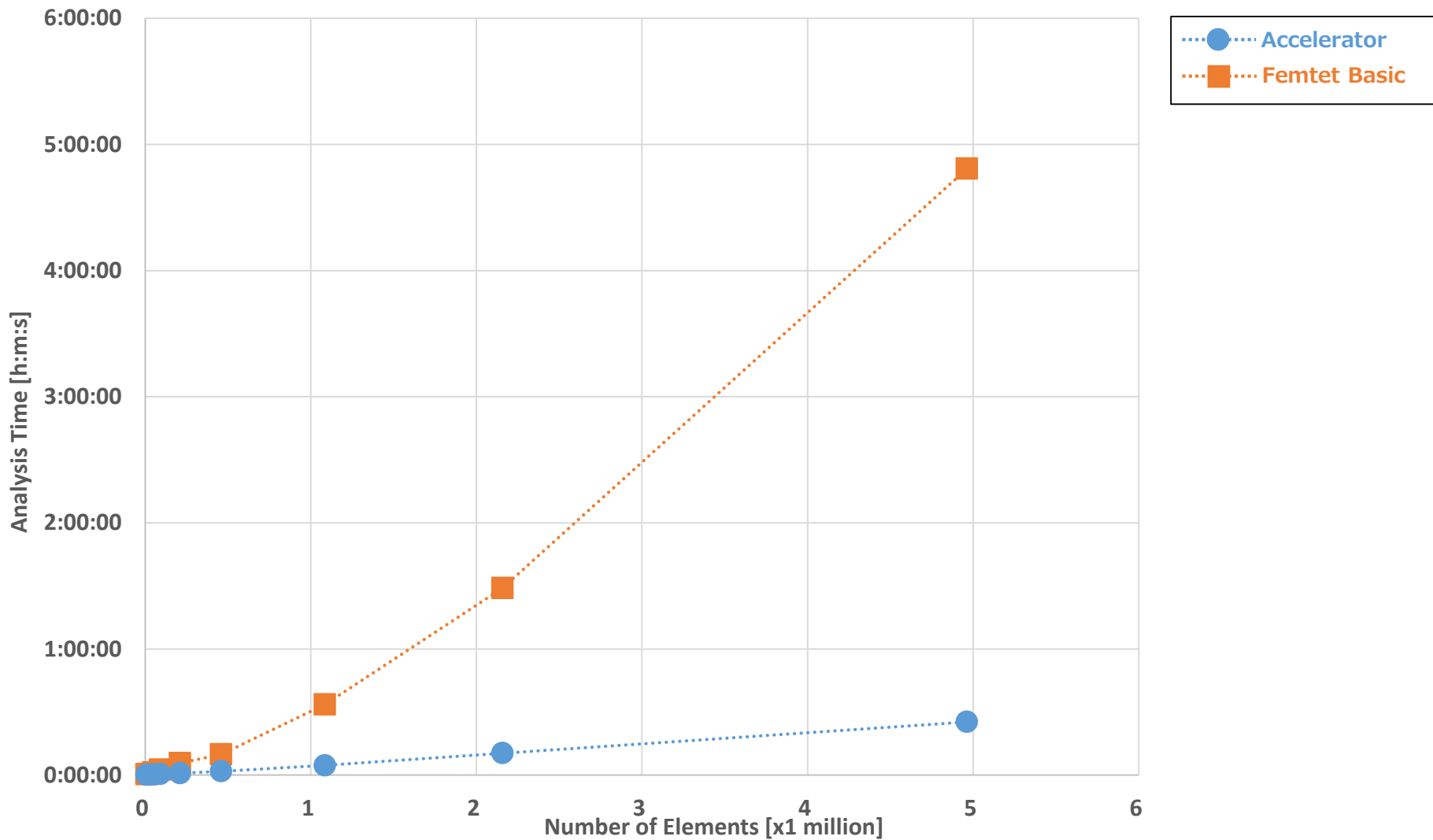
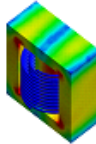
Electromagnetic (2nd-order Elements)



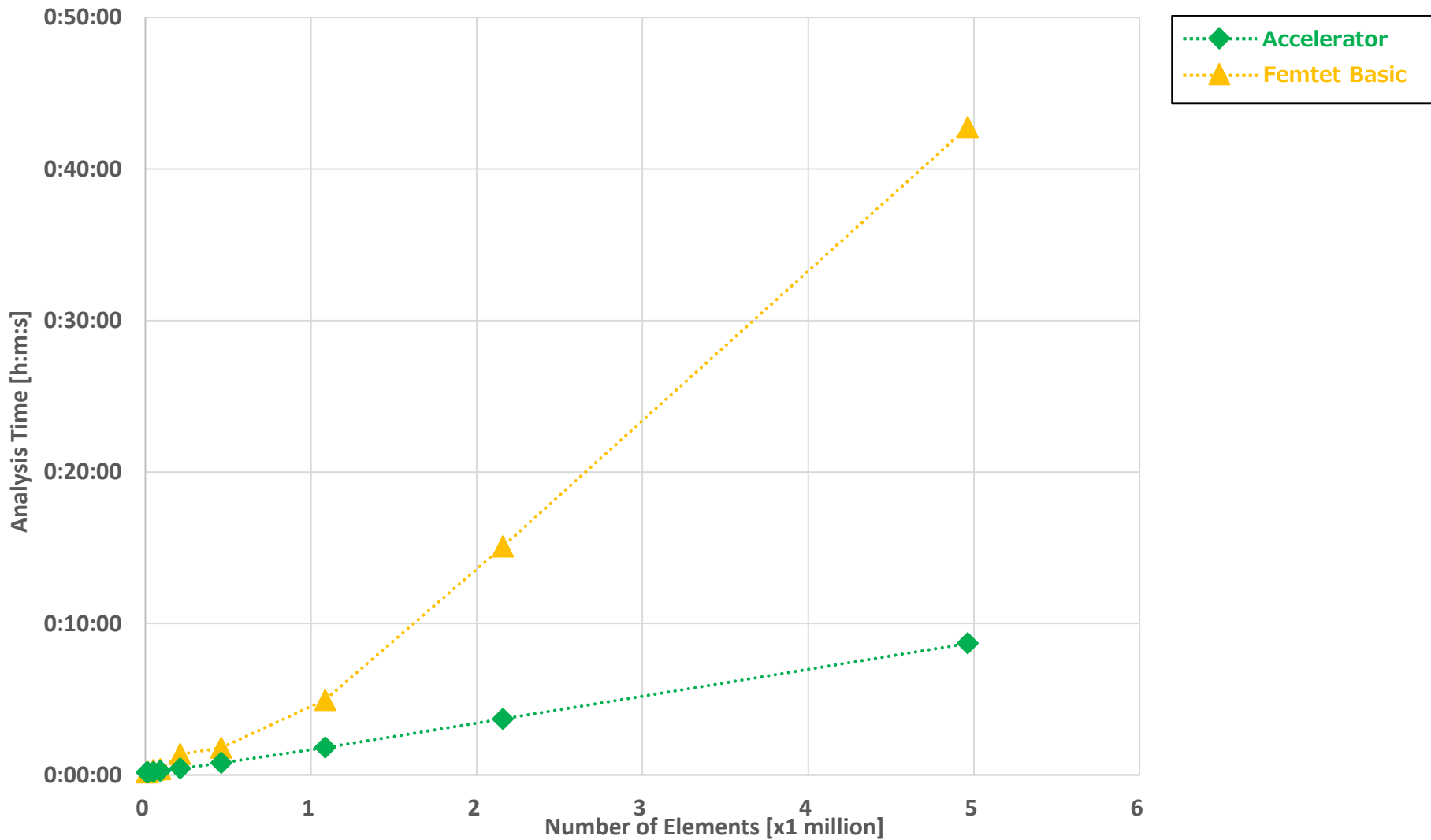
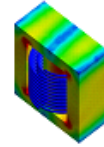
Electromagnetic (1st-order Elements)



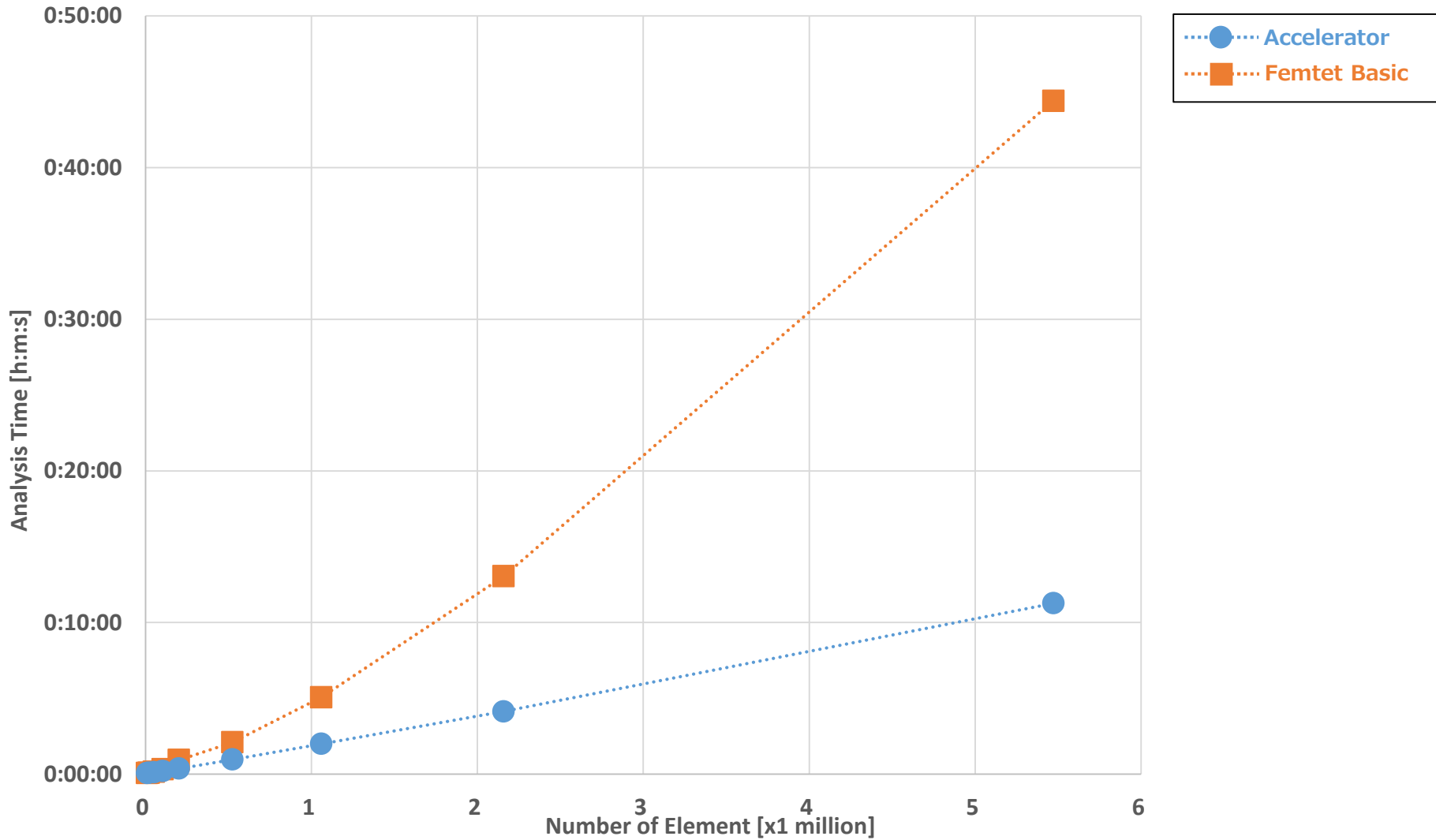
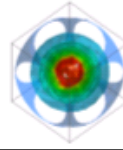
Magnetic (2nd-order Elements)



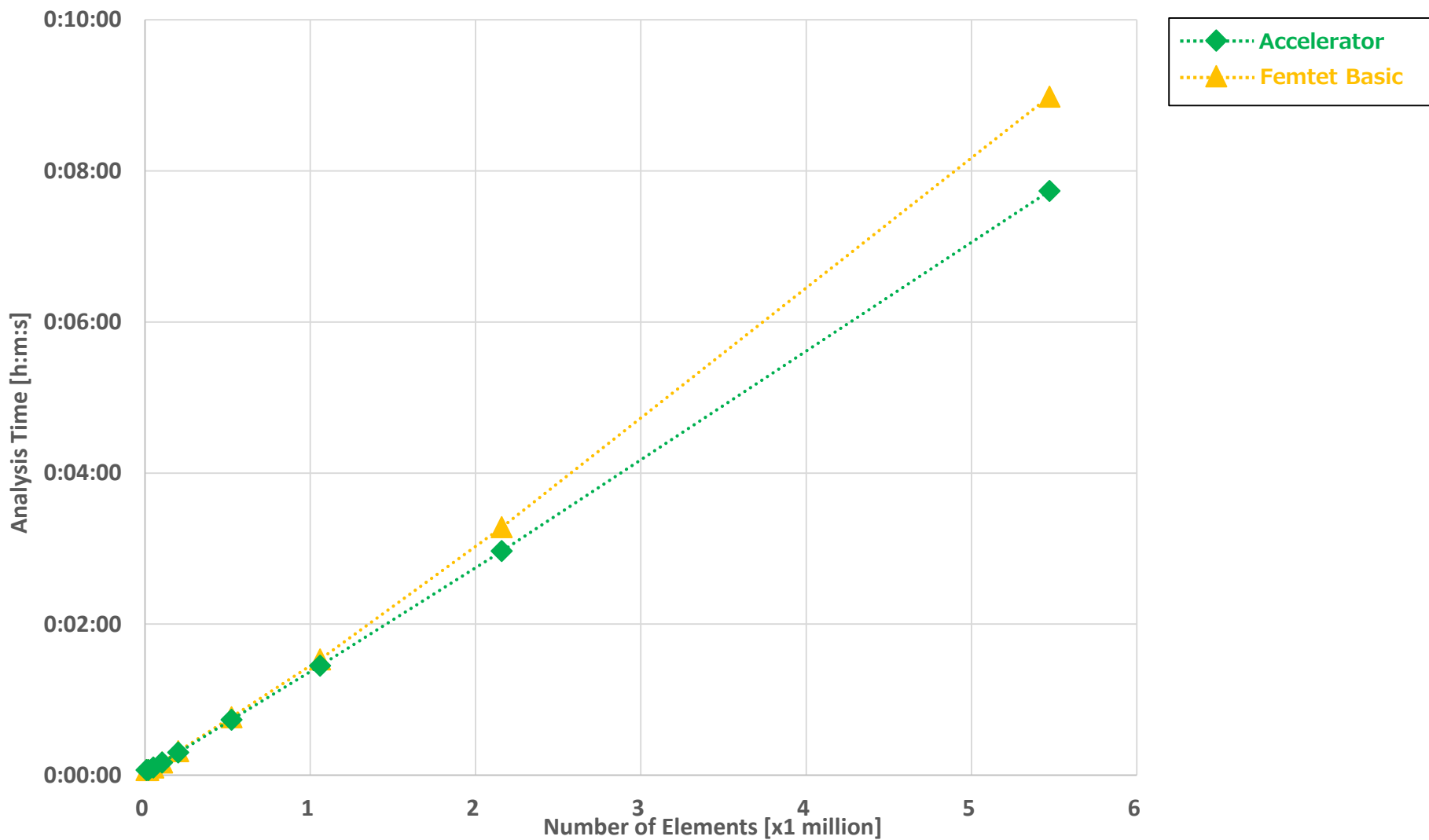
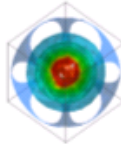
Magnetic (1st-order Elements)



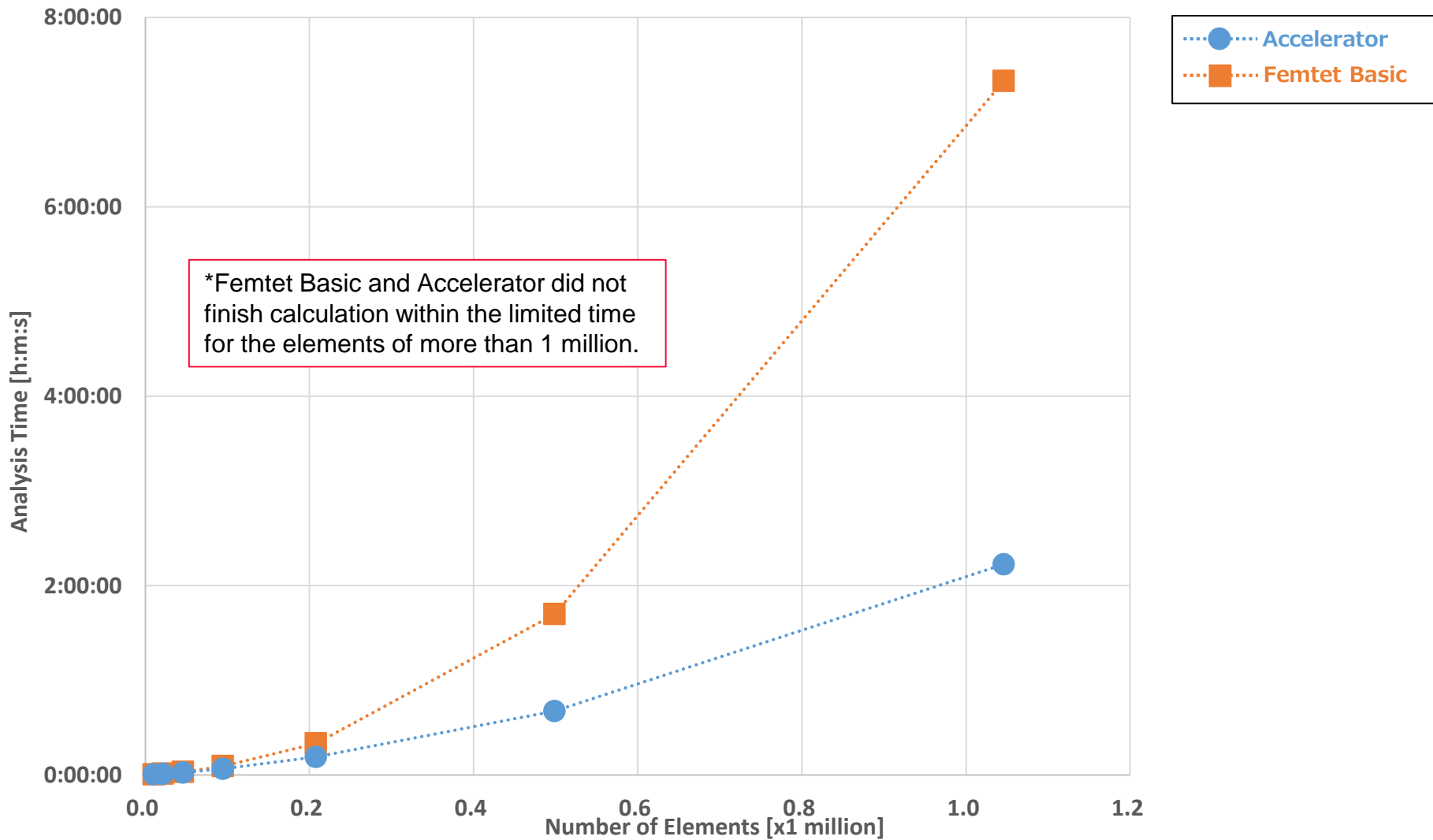
Electric (2nd-order Elements)



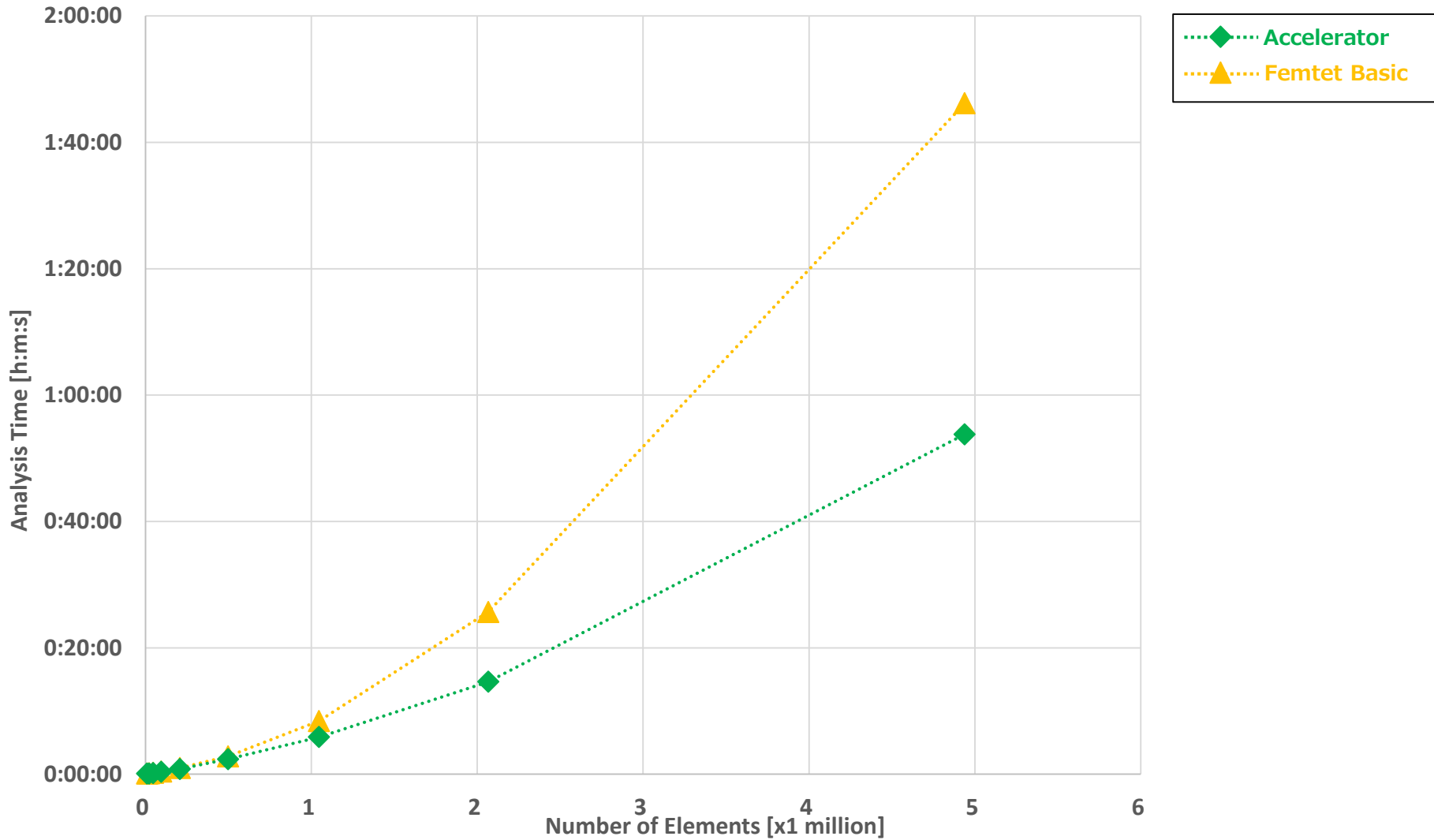
Electric (1st-order Elements)



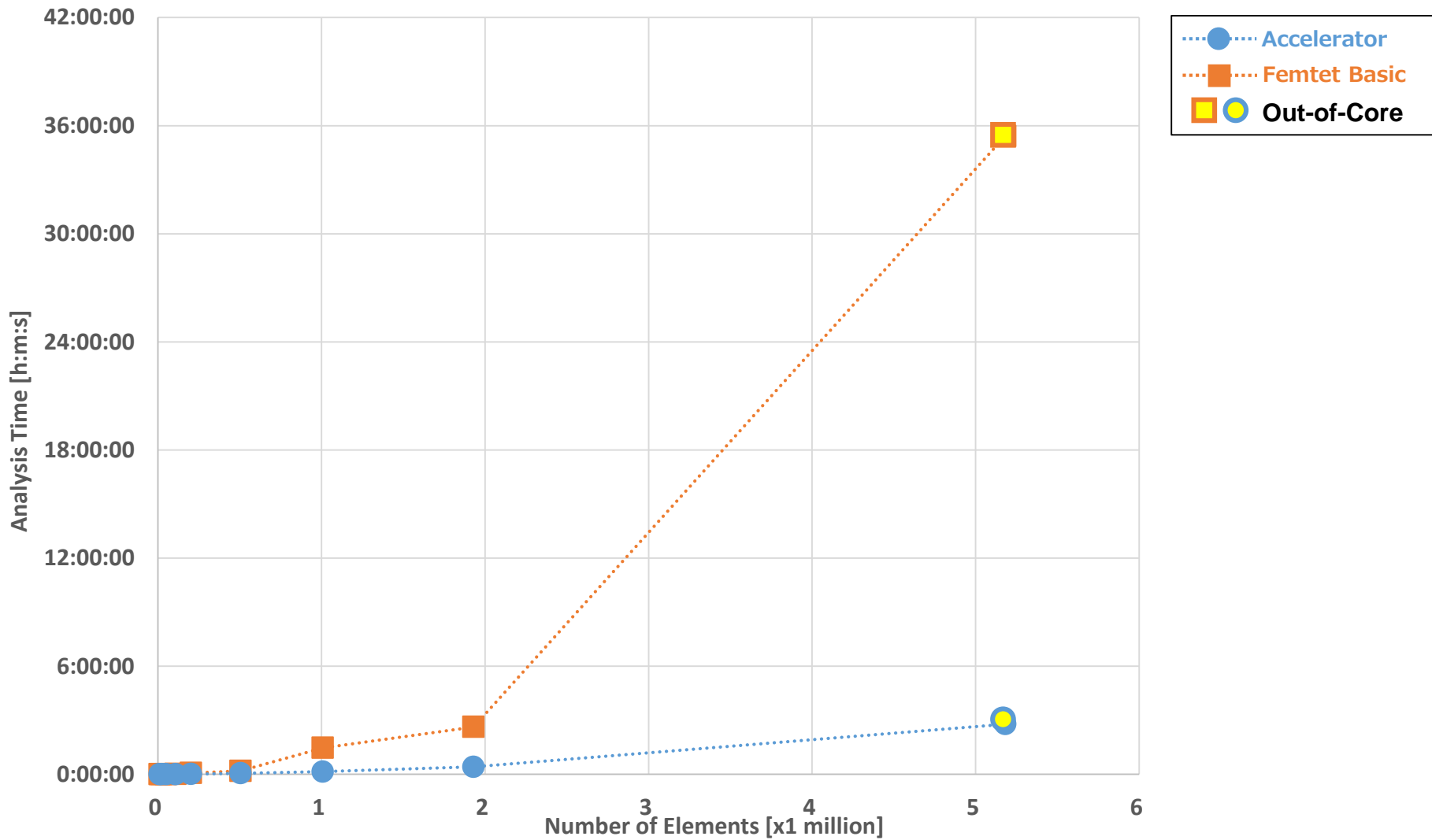
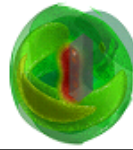
Piezoelectric (2nd-order Elements)



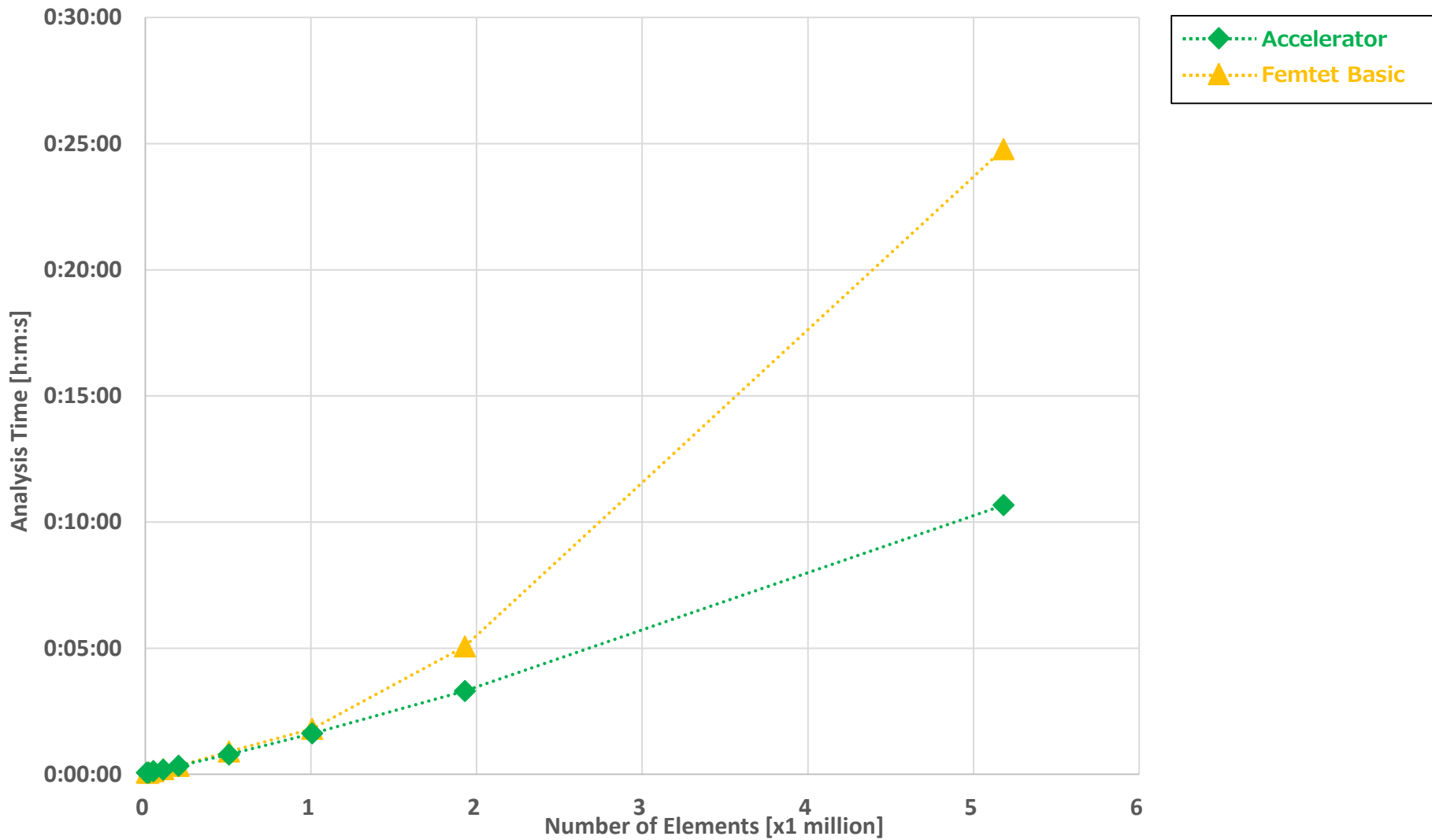
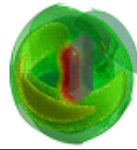
Piezoelectric (1st-order Elements)



Acoustic (2nd-order Elements)

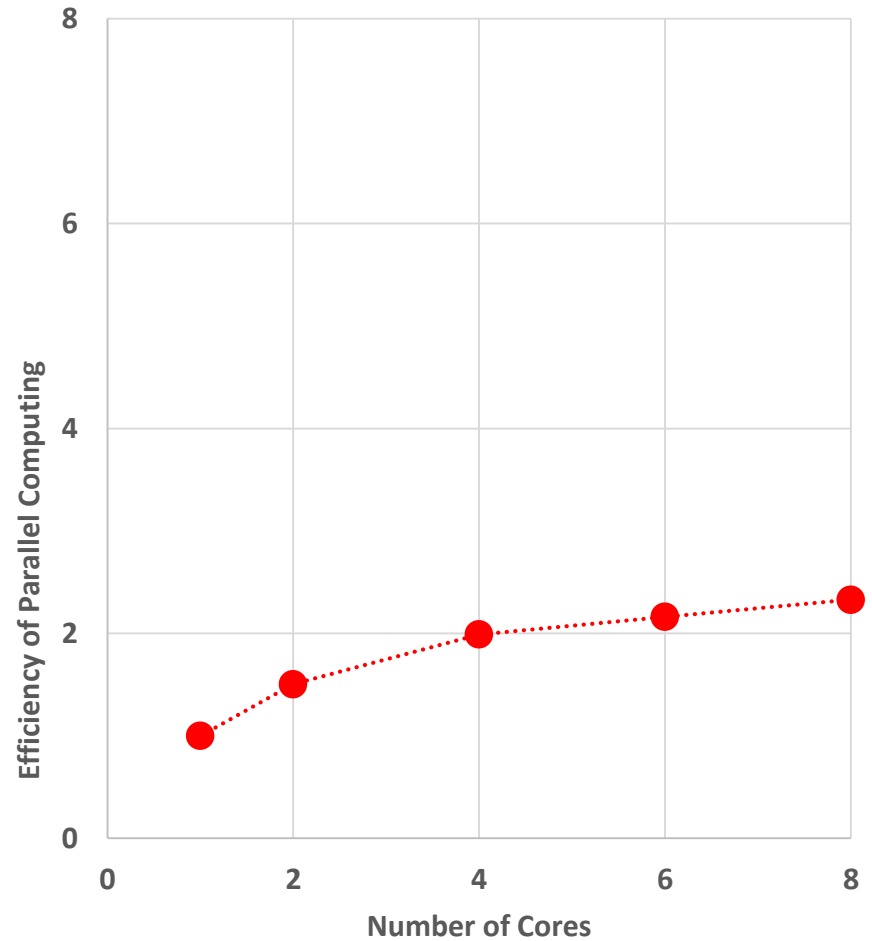
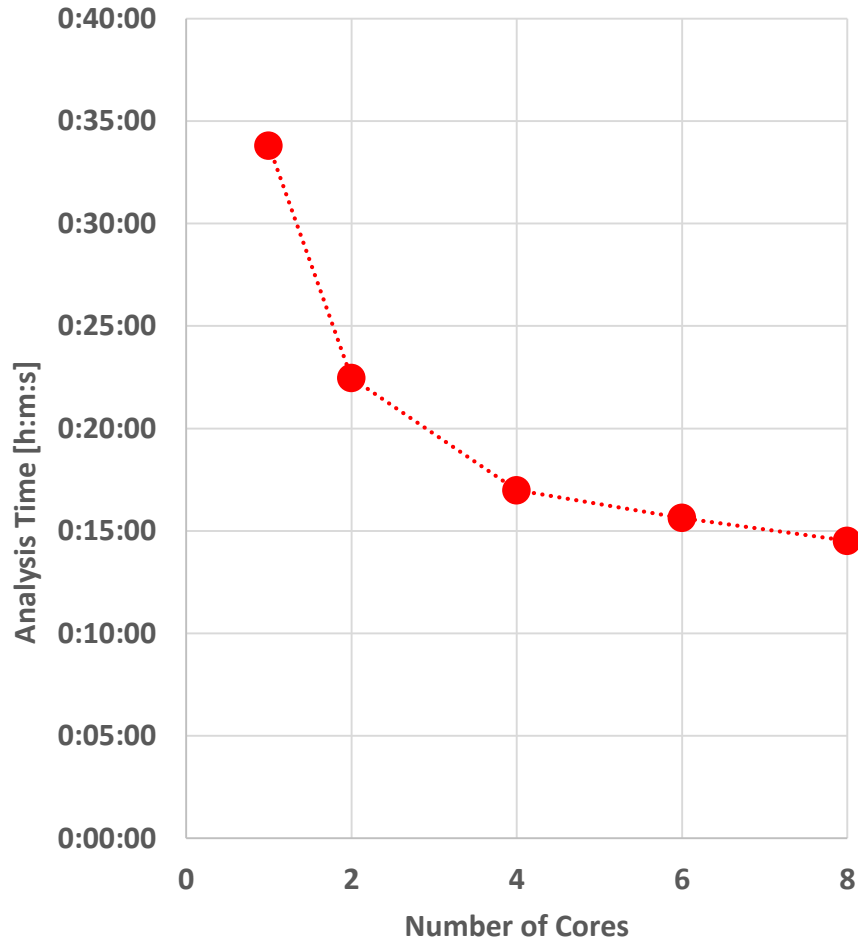
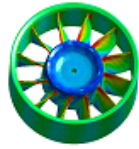


Acoustic (1st-order Elements)



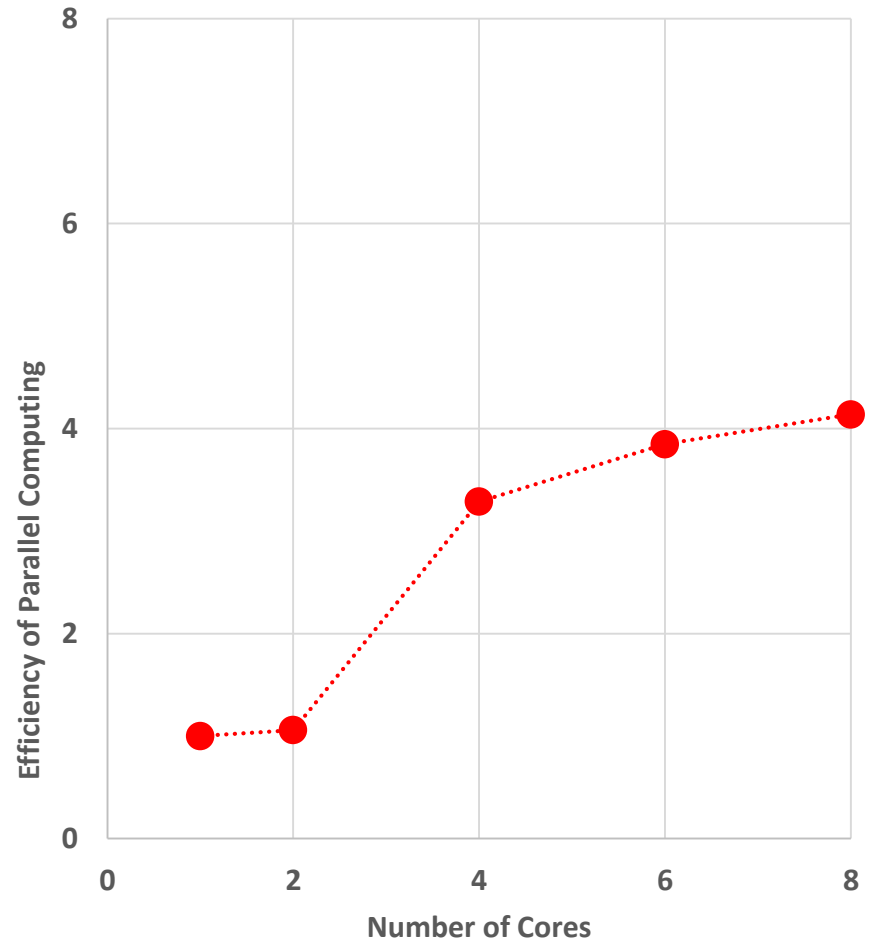
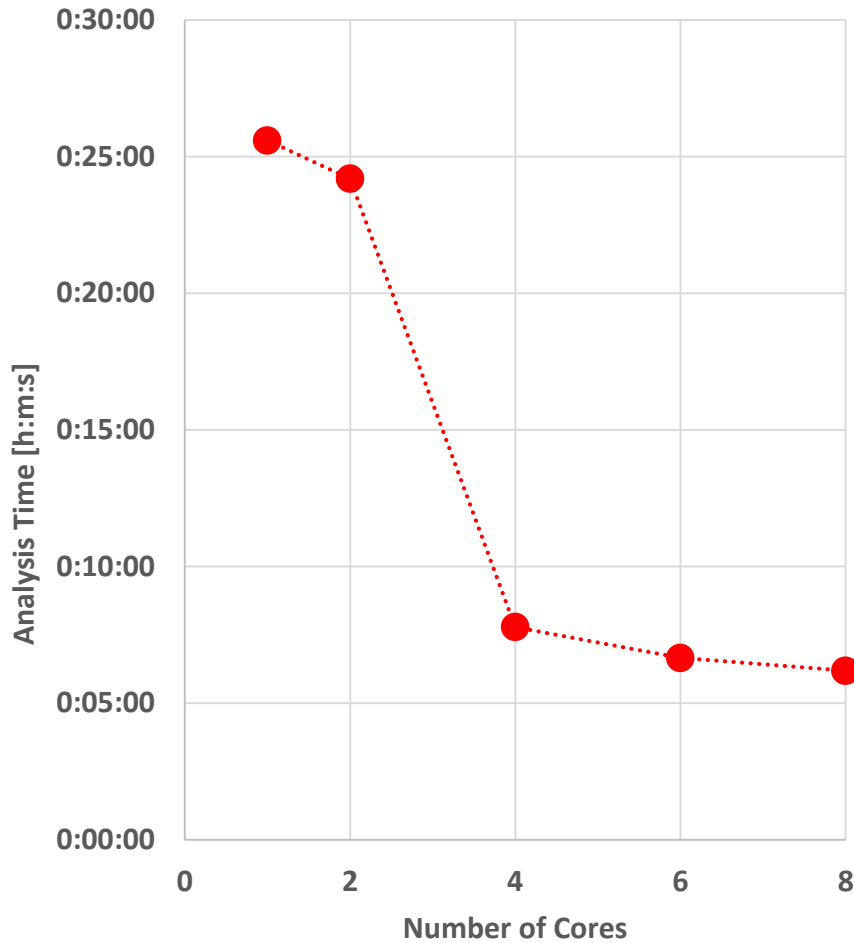
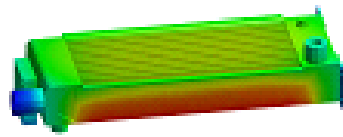
Parallel Computing

- Analysis time and efficiency are shown
- 2nd-order elements are used for the benchmark



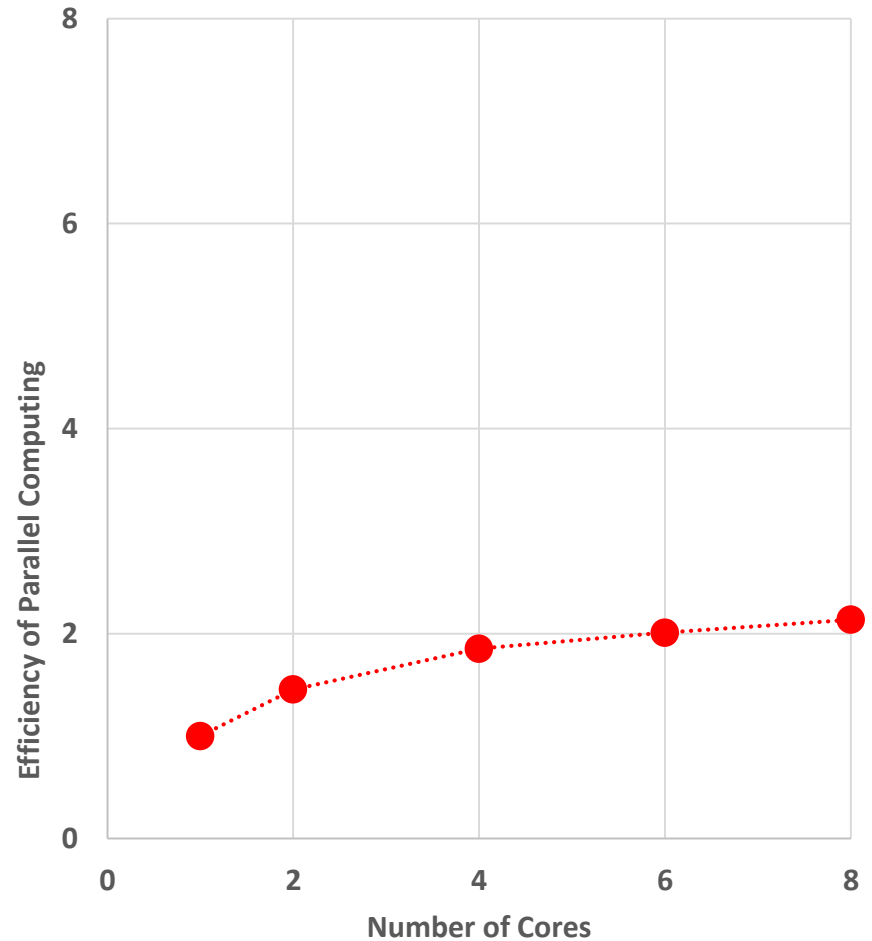
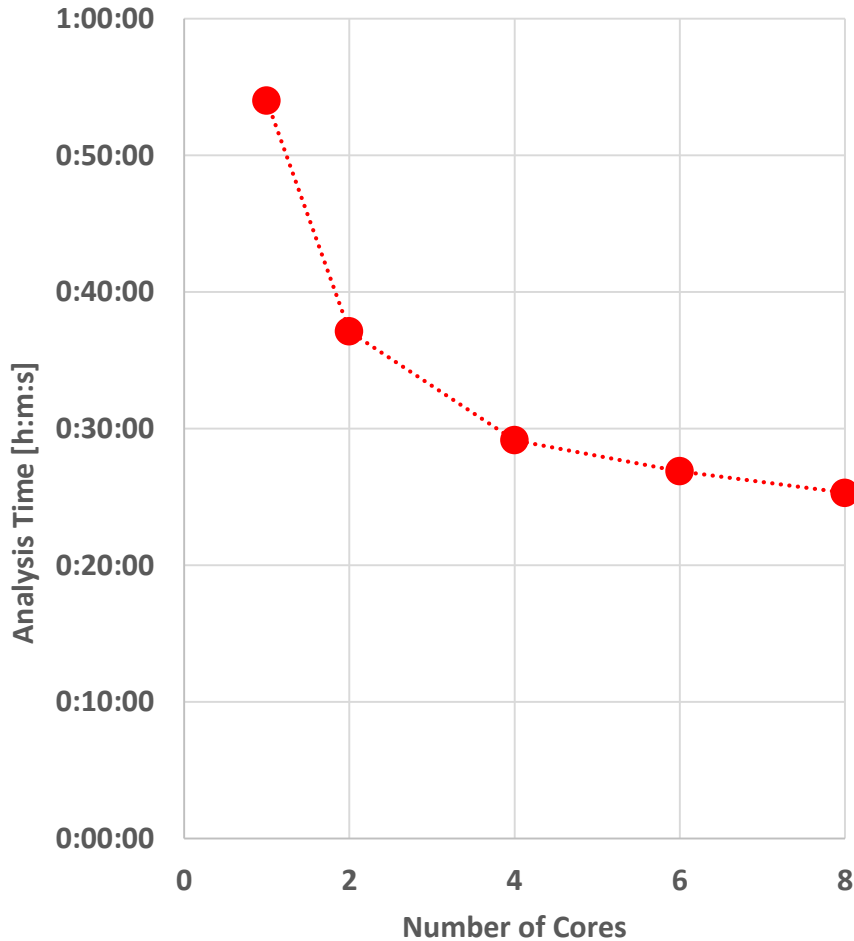
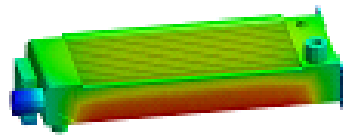
The Number of Cores: 1 million

Thermal without Natural Convection

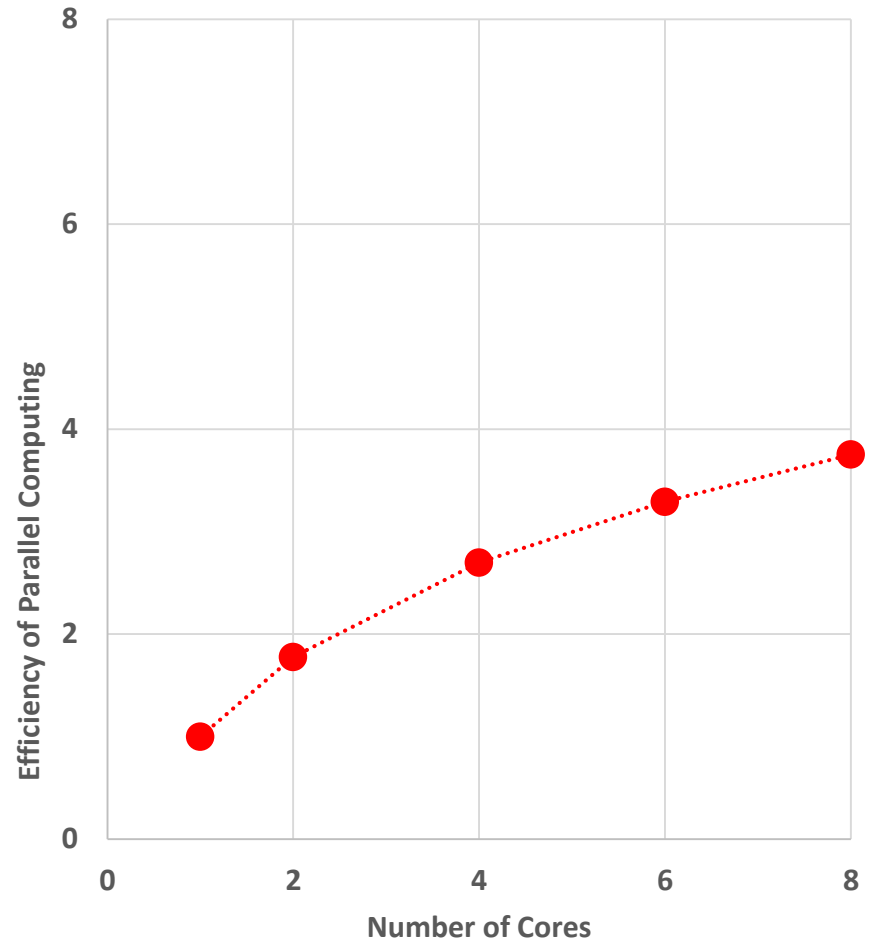
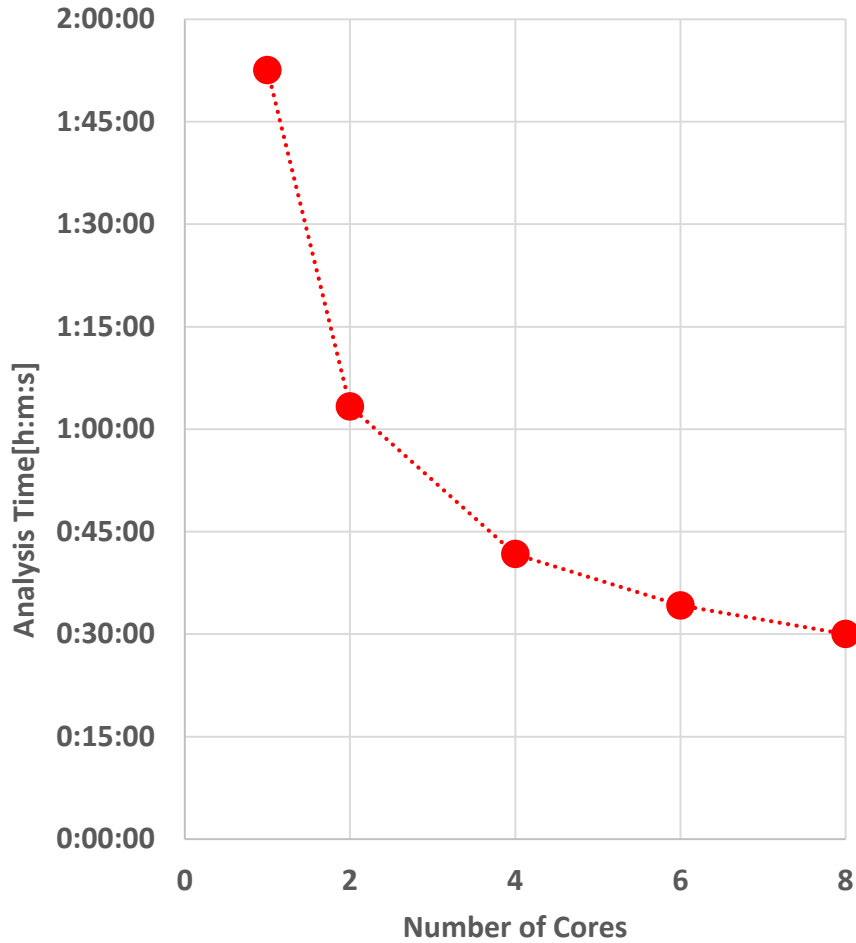
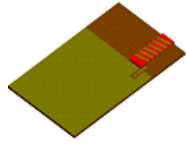


The Number of Elements: 2 million

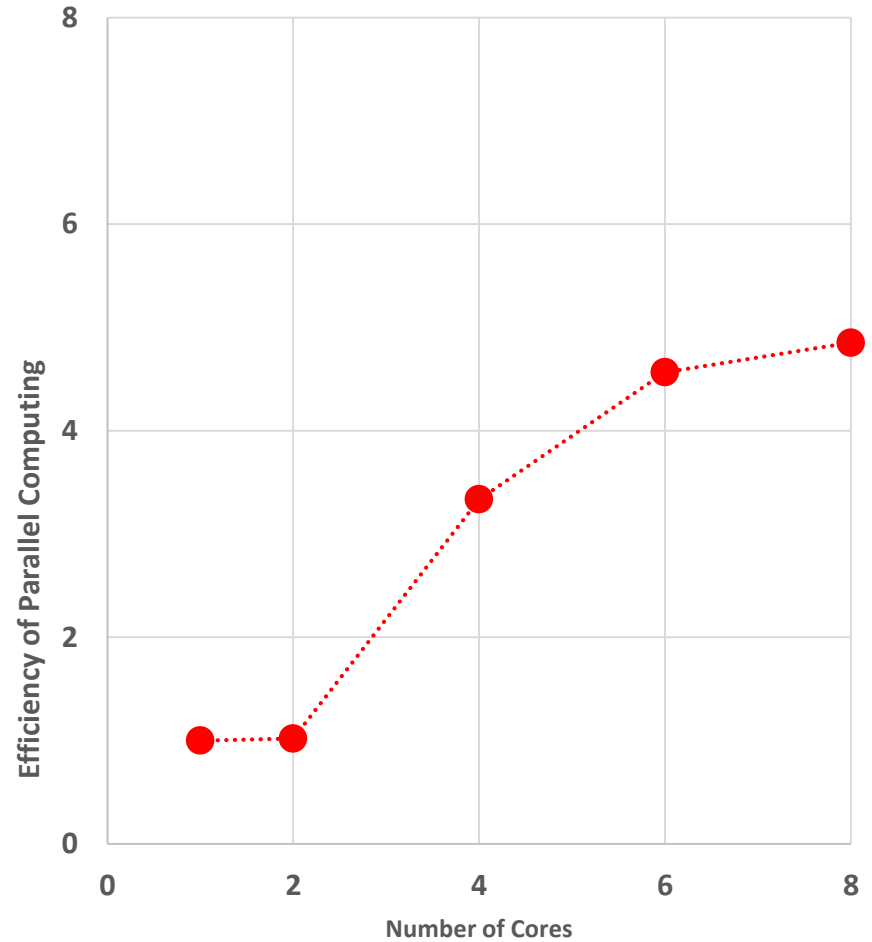
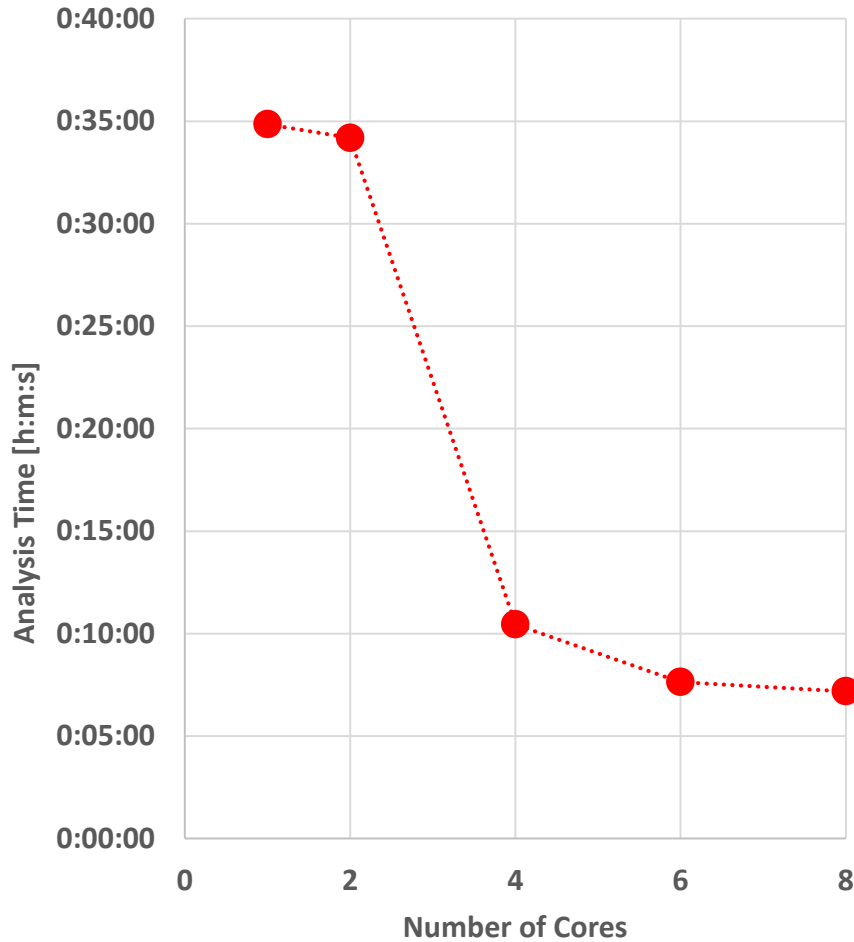
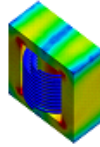
Thermal with Natural Convection



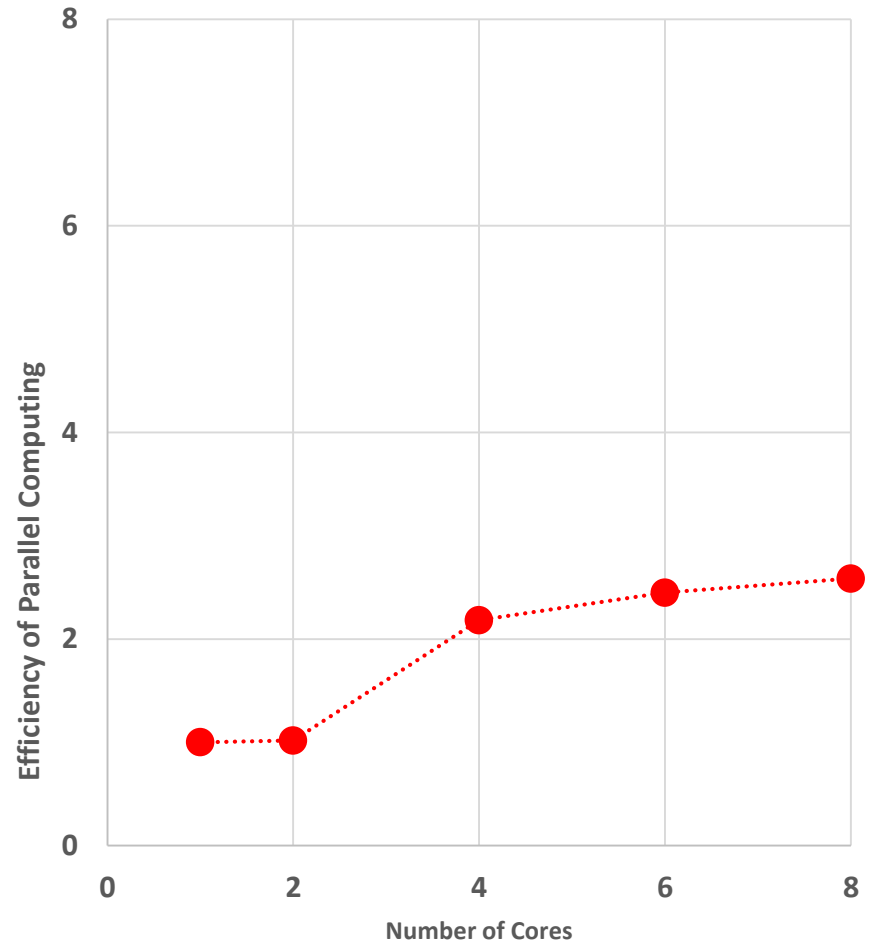
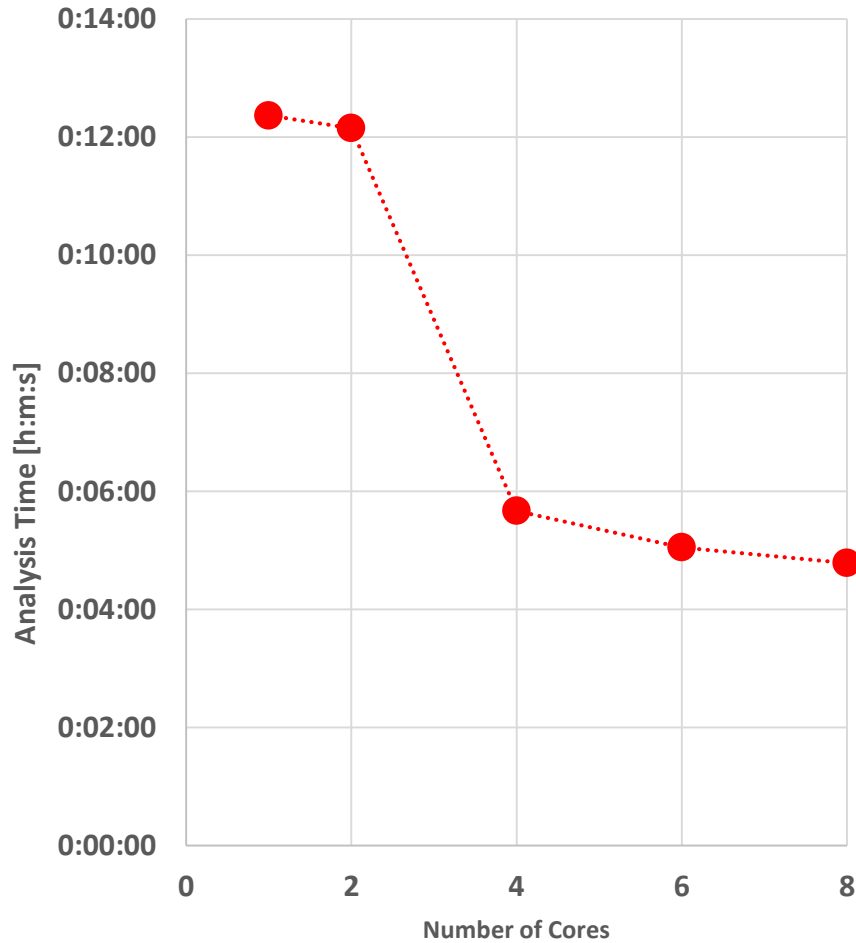
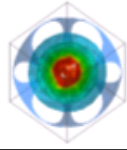
The Number of Elements: 1 million



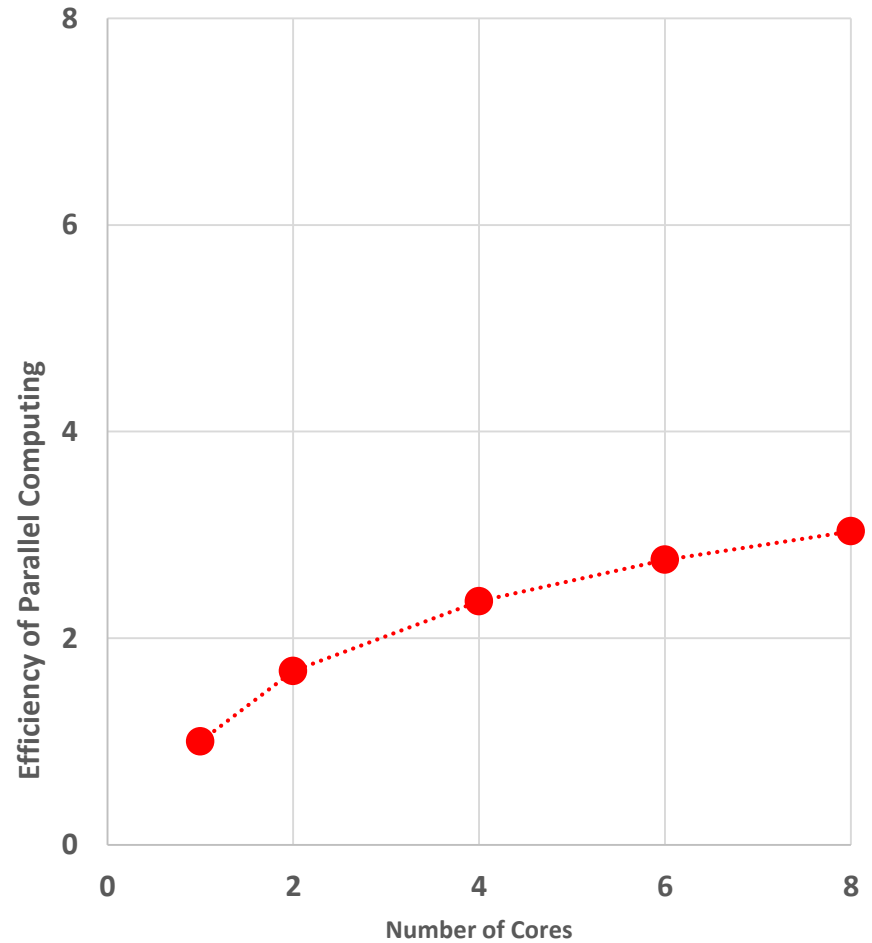
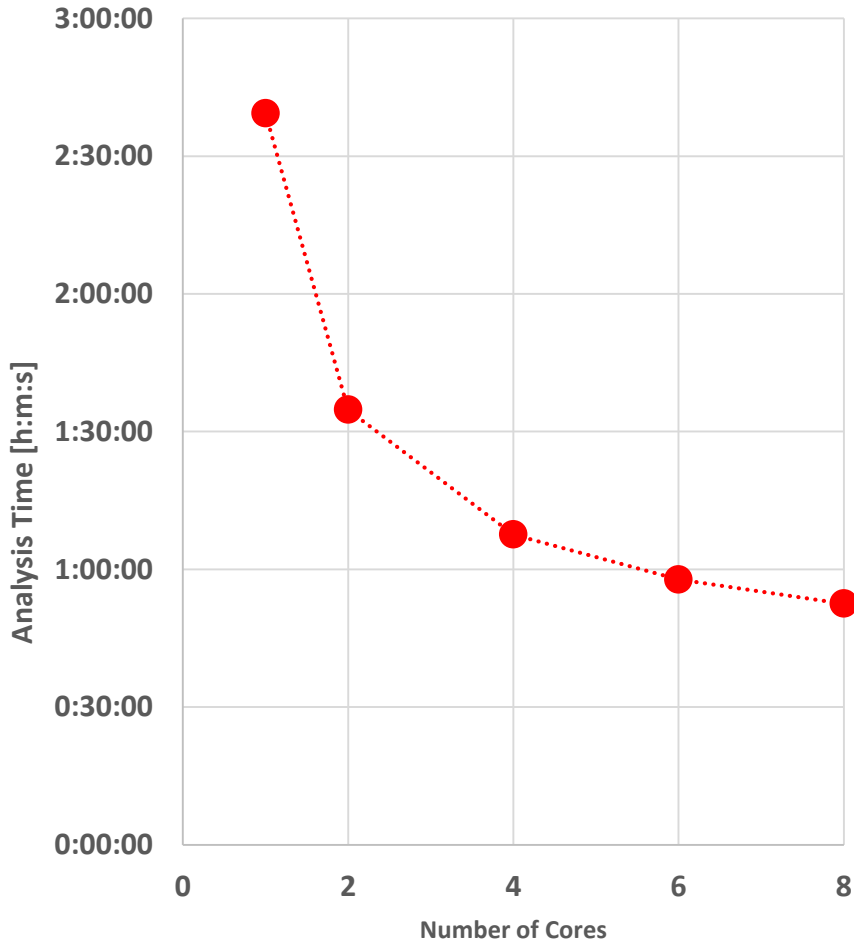
The Number of Elements: 500,000



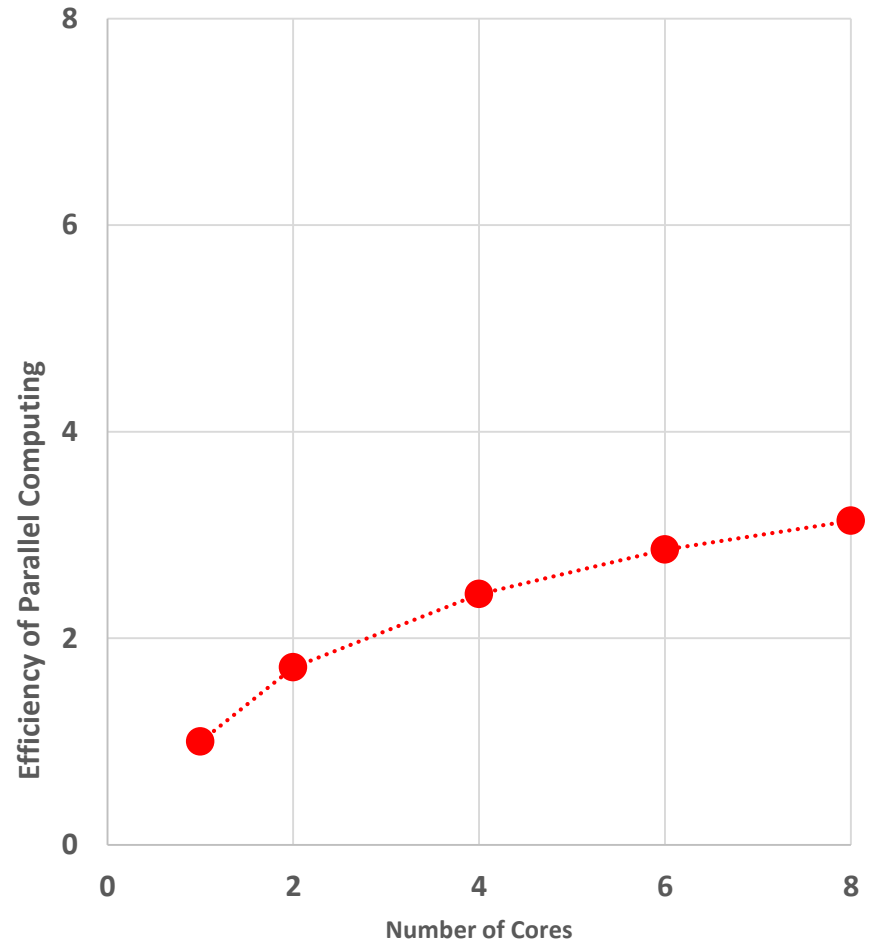
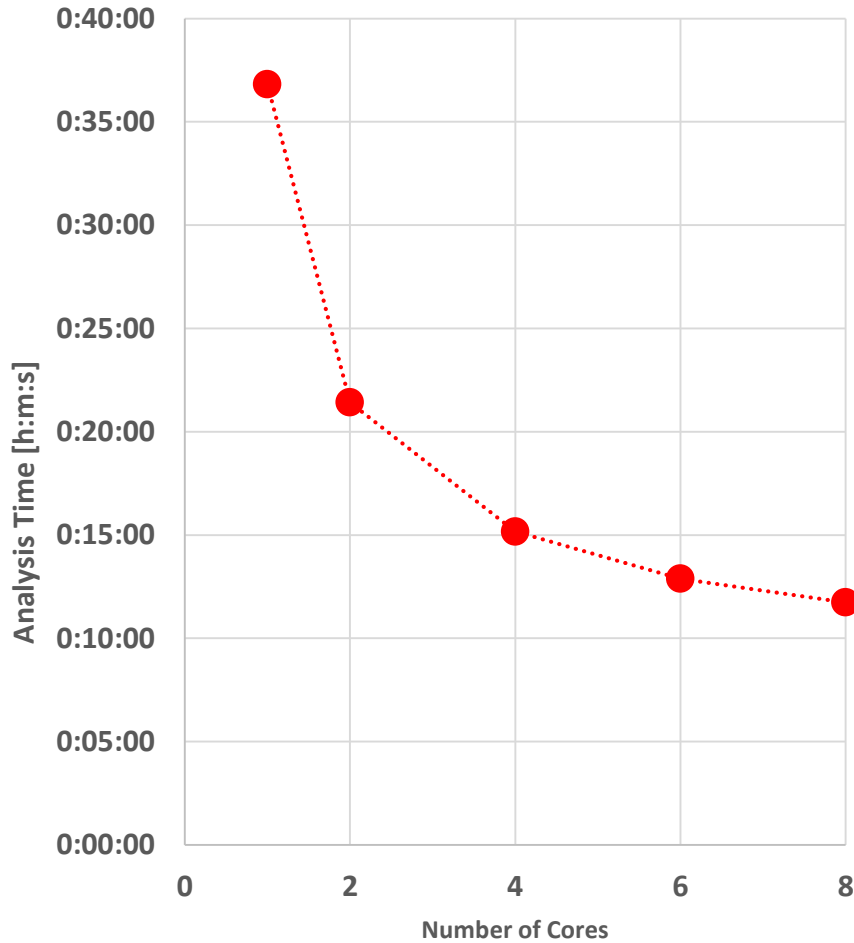
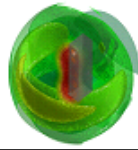
The Number of Elements: 1 million



The Number of Elements: 2 million



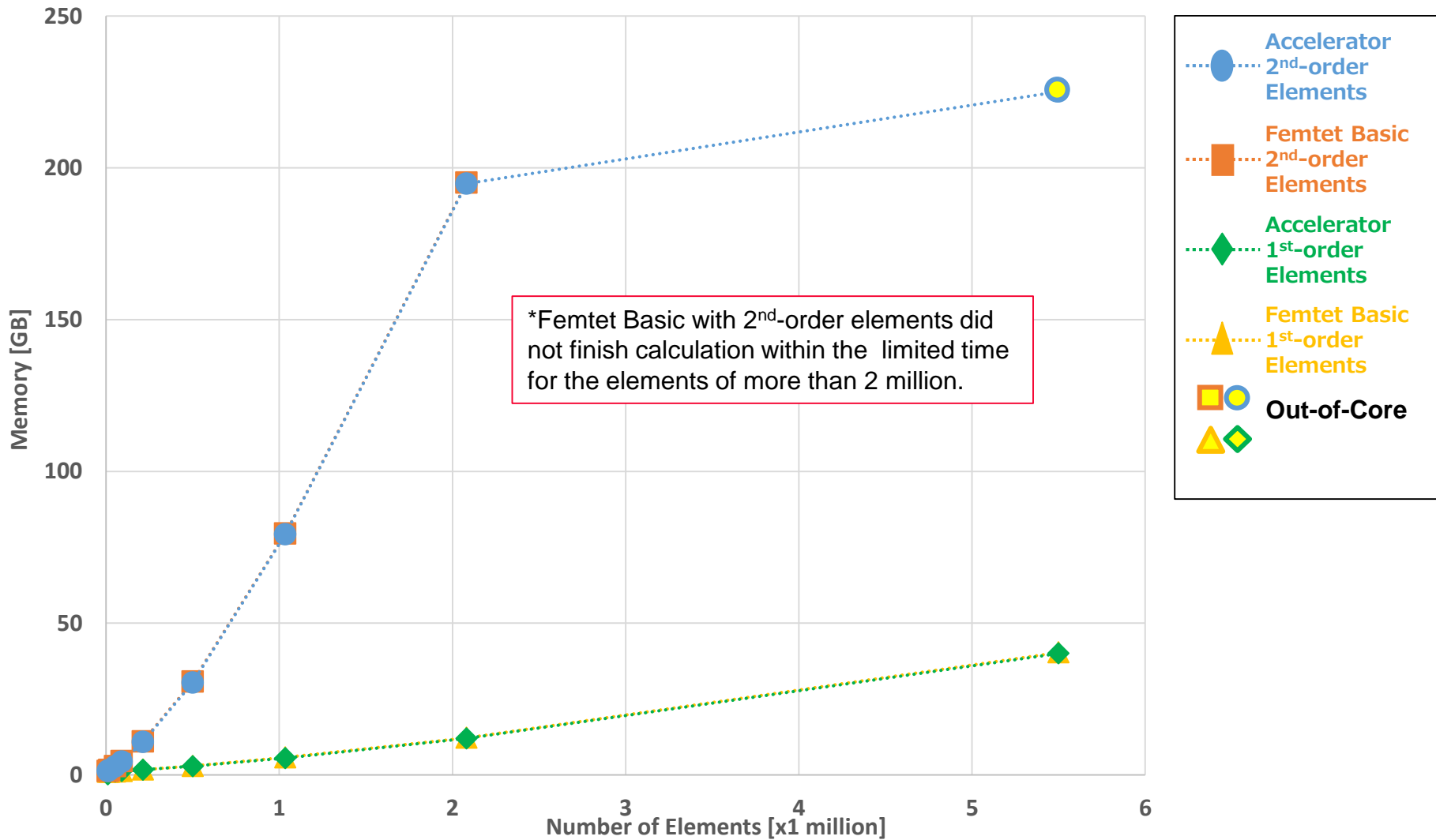
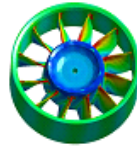
The Number of Elements: 500,000



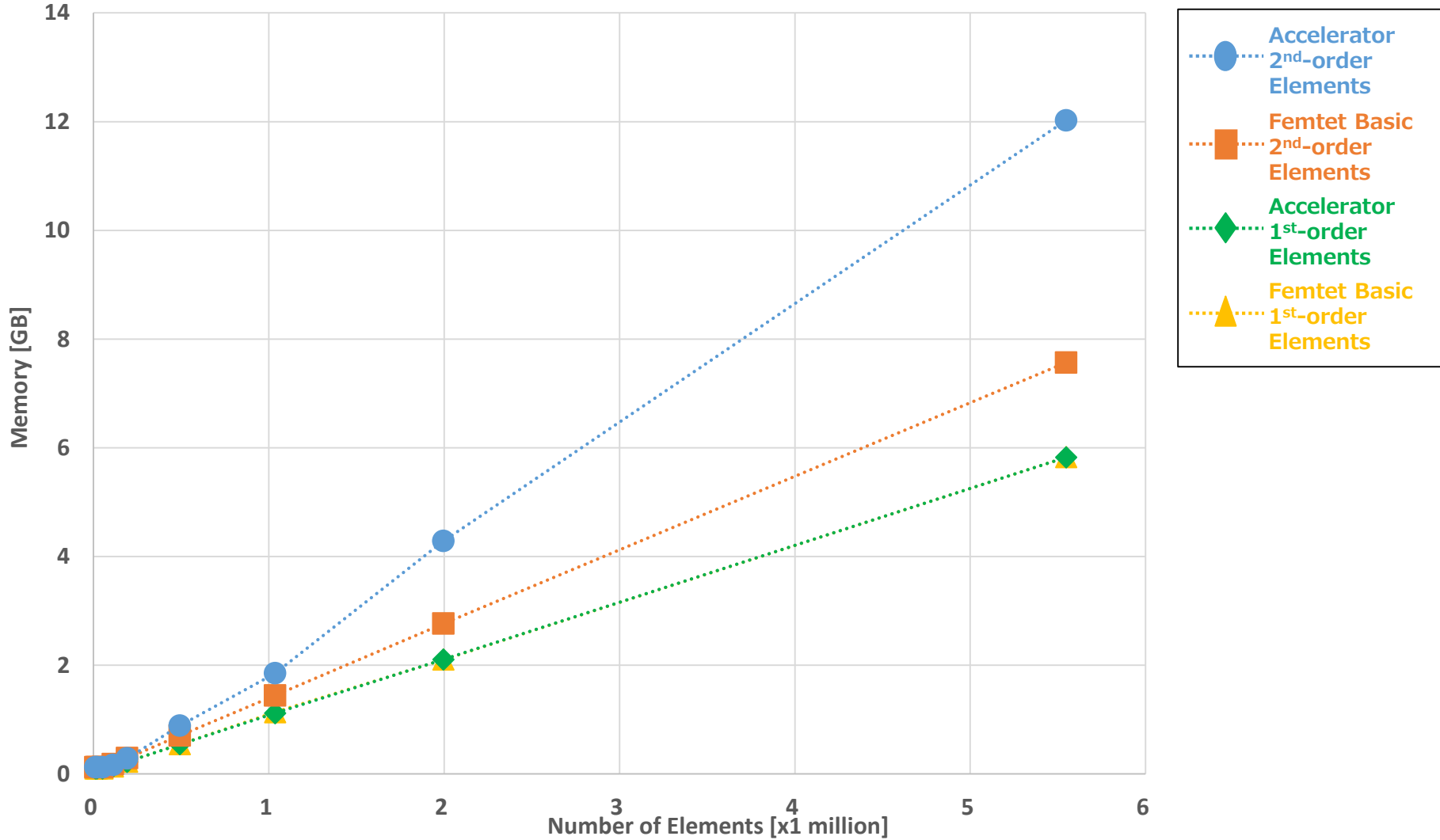
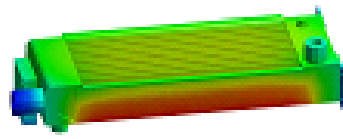
The Number of Elements: 1 million

The Number of Elements and Memory Usage

- The measured points for up to 5 million elements are plotted
- Memory usage does not change regardless of the number of cores



Thermal without Natural Convection



Thermal with Natural Convection

