Nonlinear analysis functions have been deployed on a parallel FEM basis. Running on a note PC, PC clusters and supercomputers, FrontISTR provides innovative tools for practical and advanced structural analysis.

Large-scale parallel analysis

Accurate assembled structure

Material & geometrical nonlinear

Domain decomposition for parallel computing

Accurate analysis aided by ‘Refiner’

(Thermal stress analysis of engine block)

Rolling contact between fast running train’s rail and wheel

Assemble of parts

(Stress analysis of piping system composed of many parts)

Contact indentation of cylinders

Frictional power transmission belt

Contact analysis (Contact point transfer, Hertz contact problem)

Cupping press simulation

Thermal-elastic-plastic analysis of welding residual stress

Partitioning

(MPI-OpenMP hybrid parallel)

Partitioning

(MPI-OpenMP hybrid parallel)

Contact indentation of cylinders

Cupping press simulation

Thermal-elastic-plastic analysis of welding residual stress

FrontISTR is released by “FrontISTR Forum” on the MIT license.
http://www.multi.k.u-tokyo.ac.jp/FrontISTR/index_en.php
### Simple procedure for parallel computing

**Global control**
- Boundary cond.
- Material cond.
- Analysis param.
- Visualization param.

**Analysis control**
- Mesh data
- SPMD
- Serial
- Parallel

**Front ISTR**
- Log
- Results
- Figures

**Function**
- Restart data
- Pre/Post
- User’s subroutine
- Restart
- Step control of boundary conditions

**Supported contents**
- Static linear
  - (Including thermal stress analysis)
- Static nonlinear
  - Geometry: Total Lagrangian/Updated Lagrangian
  - Boundary: Augmented Lagrangian/Lagrangian multiplier method, Finite slip contact, Friction
- Dynamic linear
  - Explicit method / Implicit method
- Dynamic nonlinear
  - Explicit method / Implicit method
- Eigen value
  - Lanczos method
- Heat transfer
  - Steady / Non-steady (implicit), Material nonlinear
- Element type
  - Tetra/Hexa/Prism, Shell, 1st /2nd order, Incompatible mode, SRI
- Utilities
  - User’s subroutine, Restart, Step control of boundary conditions

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### Pre/Post processing

REVOCAP Pre/Post, which is also being developed at the project (*), is available. At the pre-processing stage, IGES data is read, and the input data for FrontISTR is obtained through mesh generation, assembly and BC settings.

An alternative to post-processing, FrontISTR can generate files for AVS and FEMAP.

Screenshot of REVOCAP Pre/Post

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### Documents / Examples


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### Platforms

**OS:** WindowsXP(32bit) / Linux(32bit, 64bit). Executable module is available for Windows.

**C compiler:** gcc, Intel C

**Fortran compiler:** Intel Fortran

**Supercomputers:** HA8000(Univ. of Tokyo), PRIMERGY(Kyushu Univ.)

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