

FrontISTR Commons

Open-Source Large-Scale Parallel FEM Program for Nonlinear Structural Analysis

開催日：2018年5月11日(金)

会場：東京大学生産技術研究所 An401/402

設立記念シンポジウム

13:30 - 14:00 FrontISTR研究会からFrontISTR Commonsへ

- (1) 開会挨拶
- (2) FrontISTR Commons全体概要

14:00 - 17:00 最新版FrontISTRの紹介

- (3) 先進的特徴とそれを実現する基盤技術
- (4) 並列FEM基盤技術 HEC-MW
- (5) 非線形構造解析機能

(途中休憩)

- (6) ソースプログラム概要
- (7) プレ・ポスト・サポート機能
- (8) インストールの実際
- (9) 産業応用, 研究応用の紹介
- (10) 質疑応答

17:30 - 19:00 技術交流会：会場 An404

(参加費：1,000円)

お申込み先 <https://www.frontistr.org/>

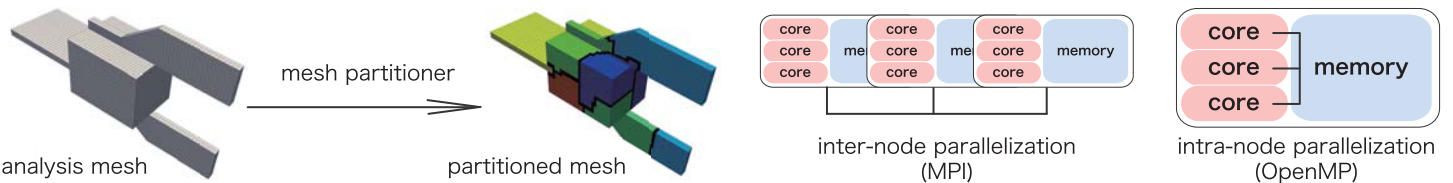
Overview

FrontISTR is open-source software for nonlinear structural analysis based on parallel finite element method. Users can manage FrontISTR on laptop, desktop computer, computer cluster and supercomputer.

Structural analysis	Analysis type	Linear / Nonlinear, Static / Dynamic, Thermal stress
	Geometry	Total Lagrangian / Updated Lagrangian
	Contact	Augmented Lagrangian / Lagrange multiplier method, Finite slip contact, Friction
Structural dynamics	Eigenvalue analysis, Steady state dynamics, Modal response	
Heat transfer analysis	Steady / Unsteady	
Material type	Hyperelastic, Viscoelastic, Creep, Thermo-Elastoplastic, Combined hardening rule	
Element type	Tetra, Hexa, Prism, Shell, Beam, Truss, Joint, Damper, Linear and quadratic interpolations, Incompatible mode	
Linear equation solver	Direct method, Iterative method (CG, BiCGSTAB, GPBiCG, GMRES)	
Preconditioner	Block diagonal slacing, Block SOR, Block ILU(p), Block ISAINV, Block IRIF, AMG	
Utilities	User subroutine, Restart, Step control of boundary conditions, Mesh partitioner, Mesh refiner	

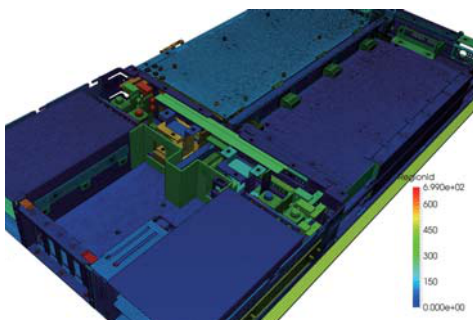
Parallel Computing

Analysis mesh is subdivided into distributed mesh by mesh partitioner. FrontISTR is implemented in MPI—OpenMP hybrid parallelization. MPI is used for inter-node communication and OpenMP is used for intra-node parallelization.

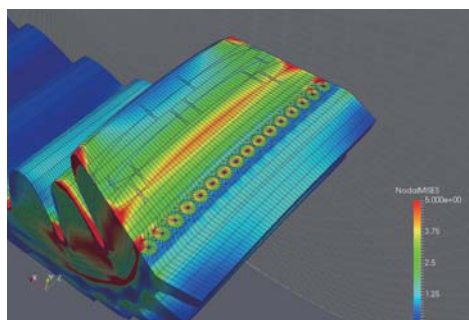


Engineering Applications

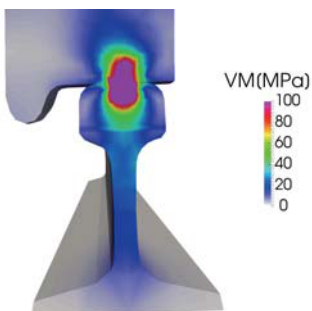
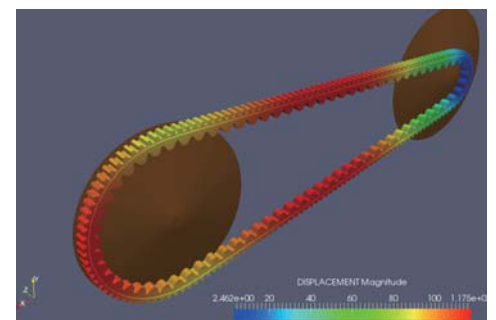
FrontISTR is distributed as an open-source software under MIT license. Various engineering applications have been done. Various users, software vendors and developers have been active in a user activity, "FrontISTR Forum".



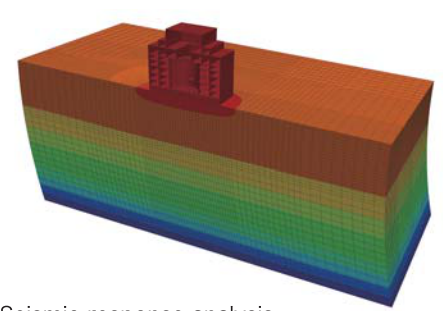
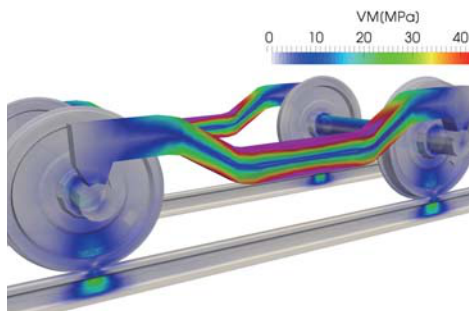
Assembly model of a computer server



Frictional contact between a belt and a driven pulley



Rolling contact between fast running train's rail and wheel



Seismic response analysis of a soil-structure interaction model