PETSc TAO

Portable, Extensible Toolkit for Scientific Computation / Toolkit for Advanced
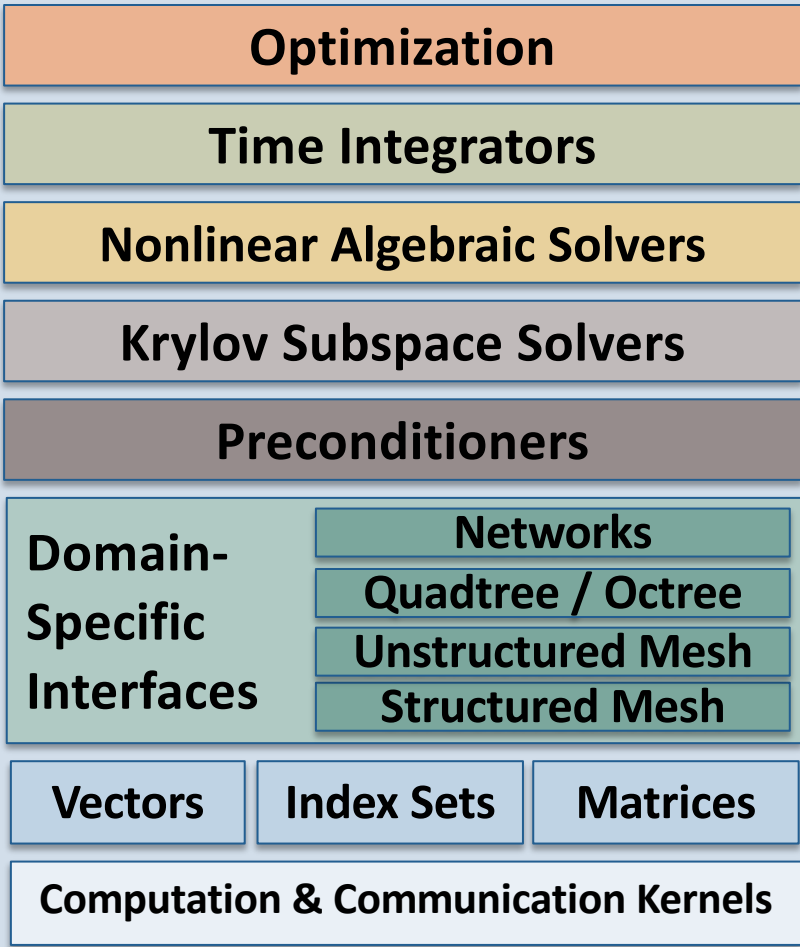
Scalable algebraic solvers for PDEs. Encapsulate parallelism in high-level objects. Active & supported user community. Full API from Fortran, C/C++, Python.


- Optimization
- Time Integrators
- Nonlinear Algebraic Solvers
- Krylov Subspace Solvers
- Preconditioners
- Domain-Specific Interfaces
  - Networks
  - Quadtree / Octree
  - Unstructured Mesh
  - Structured Mesh
- Vectors | Index Sets | Matrices
- Computation & Communication Kernels

- **Easy customization and composability of solvers <u>at runtime</u>**

  — Enables optimality via flexible combinations of physics, algorithmics, architectures

  — Try new algorithms by composing new/existing algorithms (multilevel, domain decomposition, splitting, etc.)

- **Portability & performance**

  — Largest DOE machines, also clusters, laptops; NVIDIA, AMD, and Intel GPUs

  — Thousands of users worldwide
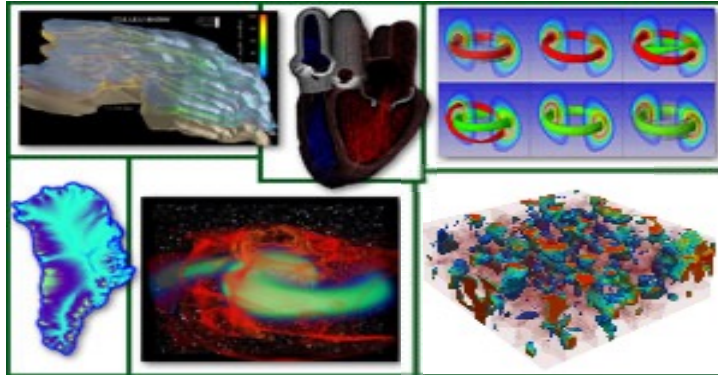
PETSc provides the backbone of diverse scientific applications.
clockwise from upper left: hydrology, cardiology, fusion, multiphase steel, relativistic matter, ice sheet modeling

https://petsc.org

Argonne NATIONAL LABORATORY

ECP EXASCALE COMPUTING PROJECT