



Firedrake

automated finite element system.



Finite element problems written in the FEniCS language (UFL + problem solving language).

Finite element language objects:
Mesh, FunctionSpace, Function...

Custom
kernel

Form compiler converts
integrals into tensor contractions

PyOP2
Interface

Mats and Dats:
global data
objects.

Kernel function:
mesh-local
operation.

Maps and Sets:
data adjacency
structures.

Loo.py loop transformation
system

MPI

Optimised compiled mesh loops

PyOP2 vectorising loop
schedule reasoner.

PyOP2

High performance
mesh execution abstraction.



dolphin-adjoint

Adjoint simulations by
automated reasoning about the
finite element problem.



FInAT symbolic finite
element library



FIAT numerical
element tabulator

PETSc

DMplex global mesh objects
Linear and nonlinear solvers