



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 unscheduled loops.



dolfin-adjoint

Adjoint simulations by
automated reasoning about the
finite element problem.



Extended FIAT
element tabulator



**PyOP2
Interface**

Mats and Dats:
global data
objects.

Kernel function:
mesh-local
operation.

Maps and Sets:
data adjacency
structures.



PyOP2 parallel loop engine

MPI

COFFEE vectorising and loop
transforming compiler



Optimised compiled mesh loops

PyOP2

High performance
mesh execution abstraction.

PETSc

DMplex global mesh objects
Linear and nonlinear solvers