Symbol

Symbolic expression

Devito operator

Devito symbolic engine (DSE)

Devito loop engine (DLE)

C code

Data

High-level function symbols associated with user data

Symbolic equations that expand finite-difference stencils

Automatic code generation and execution from high-level expressions

Symbolic optimization to reduce computation per stencil point

Loop-level optimization for efficient parallel execution

Just-in-time compilation of optimized C code

\[
\begin{align*}
    u &= \text{TimeFunction(name='u', grid=grid)} \\
    m &= \text{Function(name='m', grid=grid)} \\
    \text{eqn} &= m \times u.dt2 - u.laplace \\
    \text{op} &= \text{Operator(expressions)} \\
    \text{op}.\text{apply}(\text{time}=\text{ntime})
\end{align*}
\]