Chapter 1

oomph-lib:Document index

The purpose of this document is to provide a means of navigating around the oomph-lib documentation. The documentation is presented through a series of example codes which is fine if you know which type of problem you want to solve. In that case you can go directly to the appropriate section of the list of example codes. If you want to learn about general concept rather than a specific type of problem then it can be more difficult to find the appropriate documentation. In this index, both general concepts and specific types of problem are arranged alphabetically with hyperlinks to the appropriate documents.

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ALE methods

Action Functions

- actions_before/after_adapt
 - Use for Documentation
- actions_before/after_distribute
- actions_before/after_implicit_timestep
- actions_before_newton_solve

Adaptivity

- Spatial Adaptivity, see Spatial Adaptivity
- Spatio-Temporal Adaptivity
- Temporal Adaptivity, see Temporal Adaptivity

Advection-Diffusion Equation

- Flux Boundary Conditions
- List of Demo Drivers

Advection-Diffusion Equations

• SUPG stabilisation

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- Hermite Elements
- List of Demo Drivers
- Theory

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- Absorbing (Sommerfeld Radiation)
- Dirichlet
- Dirichlet-to_Neumann mapping
- Neumann, see Flux Boundary Conditions
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- Periodic
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• Creating

Dumping to Disk

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• Additional Unknowns

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- Customising Output
- General Theory
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- Solid Finite Element, see Solid Mechanics: Implementation: Solid Finite Element

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- Benchmark Problem
 - Parallel Distributed
- Fluid Load on Solid Boundaries (FSIWallElements)
- Implementation
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- Monolithic Preconditioning
- Overview
- Parallel Distribution
- Segregated Solvers
- Simple Model Problem
- Sparse Node Updates 1
- Sparse Node Updates 2
- · Unstructured Meshes
 - **-** 2D
 - **-** 3D
- Using Vascular Modeling Toolkit

Flux Boundary Conditions

- Creating Flux Elements
- · Spatial Adaptivity, see Spatial Adaptivity: Flux Boundary Conditions

Free Surface

- · Boundary Conditions
 - Implementation
 - Theory
- Volume Constraint

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General Conventions

- Assumptions In Multiple Meshes
- Boundary Coordinates
- Broken Virtual Functions
- Changing Newton Solver Defaults
- Constructor Arguments
- Function Type Definitions
- Mesh Constructors
- Storage of history values
- Time-dependent functions

Geometric Object

- Geometric Data
- Upgrading to GeneralisedElement

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Global Parameters

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Hanging Nodes

- Implementation Details
- Overview
- Vector-valued problems

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• Precompiled Meshes

Helmholtz Equation

• Example Problem

Hijacking

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- Data
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 - Equation Elements (The Mathematics)
 - Finite Elements
 - Generalised Elements
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Lagrangian Coordinates

• Theory

Linear Elasticity

- Introductory Example
- List of Demo Drivers
- Theory

Linear Solvers

- Choosing
- Iterative Solvers
- List of Available Linear Solvers
- · Third-party
 - Hypre
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Linear Wave Equation

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- Two-Dimensional

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MPI, see Parallel Processing

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- How To Create A Refineable Mesh
- \bullet How to Upgrade to a SolidMesh
- Inline mesh generation
- · Structured Meshing
 - List of Structured Meshes
- Third-party mesh generators
 - Geompack++
 - Tetgen
 - Triangle
 - VMTK, see Meshing: Vascular Modling Toolkit
 - xfig
- · Unstructured Meshing
 - Fluid Mechanics
 - * Three-Dimensional
 - * Two-Dimensional
- Vascular Modeling Toolkit
 - Solid Mechanics Example

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Moving Domains

- · Node Updates
 - AlgebraicNode
 - * Cylinder and Flag Example
 - * Leaflet Example
 - MacroElement

Multi-Physics

- Combining Single-Physics Elements
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- Error Estimation
- Multi-Domain Interaction
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- · Optimisation
 - Multi-Domain
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Multiple Meshes

• Introduction

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- Axisymmetric
- Discretisation
- · Free Surface
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 - List of Demo Drivers
- List of Demo Drivers
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- Three-dimensional Adaptivity
- Traction Elements

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• Changing the Integration Method

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Optimisation

- Changing the Integration Scheme
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- Storing Pre-Computed Shape Functions

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Parallel Processing

- Distributing a Problem
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- 1-Dimensional
 - Generic Objects
 - Specific Objects
- 2-Dimensional
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- Adaptive Solution
- General Theory
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• General routines

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- Disributed Block
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- Navier-Stokes LSC

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Solid Mechanics

- Beam Structures, see Beam Structures
- Compressible vs Incompressible Formulations
- Constitutive Equations
 - Generalised Hooke's Law
 - Generalised Mooney-Rivlin Law
- Displacement Boundary Conditions via Lagrange Multipliers
- Finite-Element Formulation in Cartesian Coordinates
- General Theory
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 - Solid Finite Element
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 - Solid Node
- Isotropic Growth
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- Black-box adaptation
- Boundary-condition transfer
- Curvilinear Boundaries
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- Defining Global Error Norm
- Introductory Example

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- Adaptive, see Temporal Adaptivity
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• Paraview

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Weak Form

• Poisson Equation, see Poisson Equation: General Theory

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Young-Laplace Equation

- Contact Angle Boundary Conditions
- List of Demo Drivers
- Theory

1.1 PDF file

A pdf version of this document is available.