Boundaries

Advanced course

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Content

- Patch type
- Base type
- Primitive type
- Derived type
Patch type

• Base type
  – Specifies the patch type and the associated faces
  – Location: `\constant\polyMesh\boundary`

• Numerical type:
  – Specifies the numerical type and the associated value
  – Can be primitive or derived
  – Location: field files under the time directories, e.g. `\0\U`, `0\P`, ...
Patch type

• Overview

Web: [http://www.openfoam.org/docs/user/boundaries.php](http://www.openfoam.org/docs/user/boundaries.php)
Base type

- **patch**
  - generic patch, no physical entity (except for “wall” variant)
  - E.g. Inlet, outlet patches

- **wall**
  - patch that coincides with a wall
  - represents physical surface to which wall functions can be applied

- **Symmetry**
  - For the faces located on a symmetry plane

- **empty**
  - used for front and back of 2D simulations
  - e.g. Cavity flow tutorial

- **wedge**
  - The one-cell-thick slice used in axi-symmetric setups

- **cyclic**
  - 2 physically connected patches

- **Processor**
  - Boundary between neighbouring cells that are computed on different processors
Primitive type

- **fixedValue**
  - Specify the value of $\phi$ (scalar or vector)
- **fixedGradient**
  - Specify the normal gradient of $\phi$ (scalar)
- **zeroGradient**
  - Normal gradient of $\phi$ is zero
- **calculated**
  - Boundary field $\phi$ derived from other field
- **mixed**
  - Mixed fixedValue/fixedGradient condition
- **directionMixed**
  - Mixed with difference between normal & tangential direction
Derived type

• Patch types based on the primitive types

• Overview:

- Primitive type
  - fixedValue
    - movingWallVelocity
    - pressureInletVelocity
    - pressureDirectedInletVelocity
    - surfaceNormalFixedValue
    - totalPressure
    - turbulentInlet
  - fixedGradient/zeroGradient
    - fluxCorrectedVelocity
    - buoyantPressure
  - mixed
    - inletOutlet
    - outletInlet
    - pressureDirectedInletOutletVelocity
    - pressureTransmissive
    - supersonicFreeStream
  - other
    - Slip
    - partialSlip

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