Heat transfer in concentric pipe - 2D
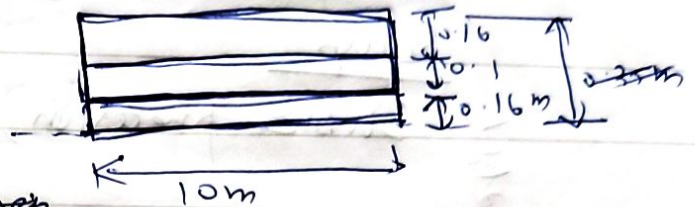
Geometry:

XY plane - look at -

Scatching - rectangles - line

as ~~too~~ sketches

Dimensions.

~~For each~~ 2nd & 3rd rectangle give

~~classified as~~ add frozen

Concept - surface from sketches - sketch 1 - Add ~~new~~

Concept - Surface from sketches - sketch 2 - Add frozen.

Concept - Surface from sketches - sketch 3 - Add frozen

Select the ~~two~~ three surfaces and click Share Topology

Save ____ Body - select one three rectangles → Right click

→ form new part - Generate

~~Close Geometry.~~ → Click Share topology → Generate

Mesh:

Generate Mesh - Set element size as 0.05m

Mesh - ~~insert~~ face meshing - ~~set~~

update.

Mesh - insert - sizing - ~~select~~ face sizing. _edge_

as body select

Select the faces - element size = ~~5mm~~ 20mm 50mm

Mesh - insert inflation

- select the top surface as geometry.
- select the edge as boundary.
- maximum layers = 10, Growth rate = 1.2

- Update
  - similarly for bottom surface

Create Named selection for hot fluid inlet, hot fluid outlet, cold fluid inlet, cold fluid outlet and ~~wall~~ wall ~~interior~~, wall exterior, Cold fluid, Hot fluid, ~~symmetry~~ symmetry

Setup:

Double precision, Solver process 4

Energy = ON

Materials - fluid - Fluent Database - water liquid
                                            - change / create - close

Cell zone conditions - Fluid - ~~solid Body~~ cold fluid - Material name - water liquid
      "   "   hot fluid   - water liquid
                        ~~Wall~~ wall - solid   "   "
                                                     "   "

Boundary conditions:
    hot fluid inlet : mass flow inlet
                    : mass flow rate = 4 kg/s
                      temp = 80°C = 353.15 k
    cold fluid inlet : mass flow inlet
                     : mass flow rate = 2 kg/s
                       temp = 40°C = 313.15 k
        wall interior : Thermal : Thermal conditions : convection
    ~~wall~~   Coupled
→ Initialization
→ Run calculation   No. of iterations = 10000