Exercise 7: Artificial bladder 1

- Blank Model
- Component/2D axisymmetric
- Geometry/Set length unit: mm
- Global/Definition/Parameters/ V_sph: 400 [ml], R_sph: (V_sph*3/4/pi^(1/3), T_sph: 5 [mm], para: 1
- Geometry/Circle/ Radius: R_sph+T_sph, sector angle: 90
- Geometry/Circle/ Radius: R_sph, sector angle: 90
- Geometry/Difference/ c1 – c2
- Geometry/Rectangle/ Width: R_sph+T_sph, Height: 1, Corner r: 0, z: R_sph+T_sph
- Geometry/Form Union/ Action: Form an assembly
- Add Physics/Structural Mechanics/Solid Mechanics
- Solid Mechanics/Linear Elastic Material/ E = 3 [MPa], ν = 0.4, ρ = 1250 [kg/m^3]
- Solid Mechanics/Linear Elastic Material/ Force linear strains (to model linear elasticity)
- Solid Mechanics/More Constraints/Symmetry/ Selection: lower edge of balloon
- Solid Mechanics/Domain Constraints/Prescribed Displacement/ Selection: plate, x=0, y=-para*1[mm]
- Component/Definitions/Pairs/Contact Pair/ Source: plate edge, Destination: balloon edge
- Solid Mechanics/Pairs/Contact/ Pair selection: Contact Pair 1
- Add Study/Stationary/ Results while solving, Study extension: Auxiliary sweep, parameter para, range(0,1,10)
- Compute
- Results/2D Plot Group/Surface/ Expression: Component/Solid Mechanics/Strain/Principal strains/First principal strain (solid.ep1), Add deformation display with scale factor=1
- Results/Derived Values/Integration/Surface Integration/ Selection: plate, Expression: -solid.RFz
- Results/Table Graph/ Table: Table 1 (i.e. –solid.RFz); x-axis data: para. Plot
- Solid Mechanics/Material Models/Hyperelastic Material/ Hyperelastic Material: Mooney-Rivlin, two parameters, C10=0.5 [MPa], C01=0.01 [MPa], κ=60 [MPa], ρ = 1250 [kg/m^3], Selection: balloon
- Compute
- Compare strain, compare reaction force