

Numerical experiment 7

Material parameters:

- Os: Young's modulus $E = 1,71 \times 10^{10}$ [Pa] and Poisson's ratio $\nu = 0,25$.
(1) Ti6Al4V: Young's modulus $E = 1,15 \times 10^{11}$ [Pa] and Poisson's ratio $\nu = 0,3$.
(2) Chirulen: Young's modulus $E = 3,4 \times 10^8$ [Pa] and Poisson's ratio $\nu = 0,4$.
(3) CoCrMo: Young's modulus $E = 2,08 \times 10^{11}$ [Pa] and Poisson's ratio $\nu = 0,3$.

Boundary conditions:

- Prescribed zero displacement on 1-2, 3-4
Pressure $0,215 \times 10^7$ [Pa] on 5-6.
Unilateral contact boundary: 7-8, 9-10 and 11-12.

Discretization statistics:

- Model I (angle 3° between axis of femur and vertical axis)
13 subdomains, 3737 nodes, 7132 elements,
31+31+15 unilateral contact conditions, 344 interface elements.
Model II (angle 5° between axis of femur and vertical axis)
13 subdomains, 3780 nodes, 7208 elements,
31+31+15 unilateral contact conditions, 350 interface elements.
Model III (angle 7° between axis of femur and vertical axis)
13 subdomains, 3763 nodes, 7180 elements,
31+31+15 unilateral contact conditions, 346 interface elements.

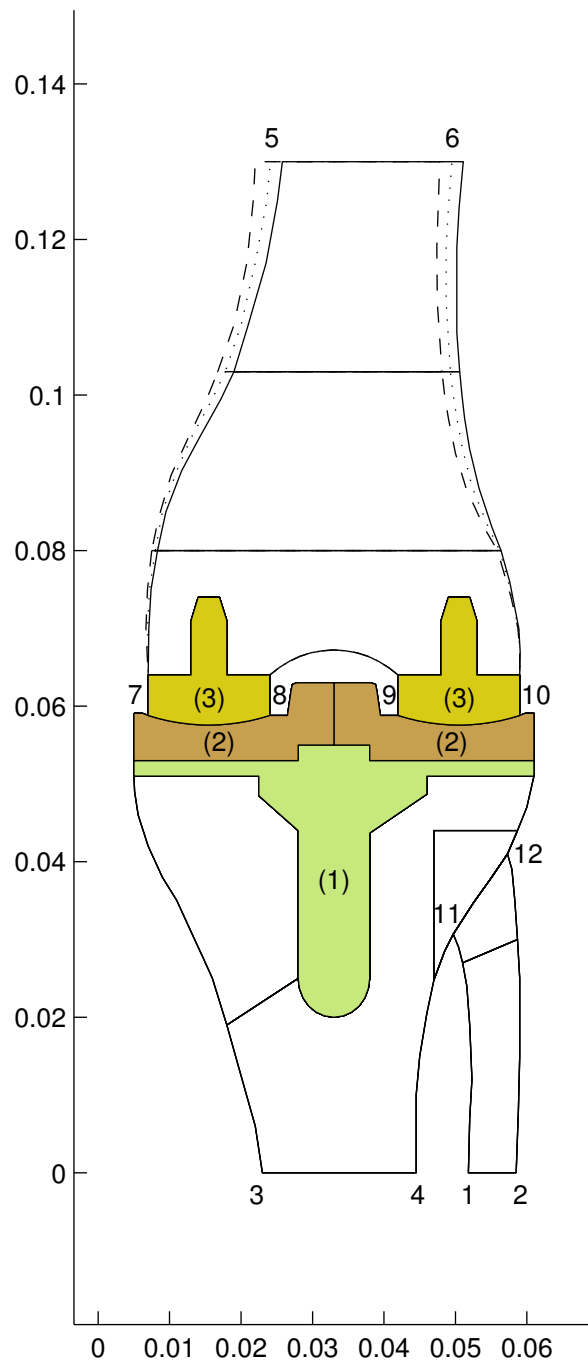


Figure 55: Geometry (Model I, II, III)

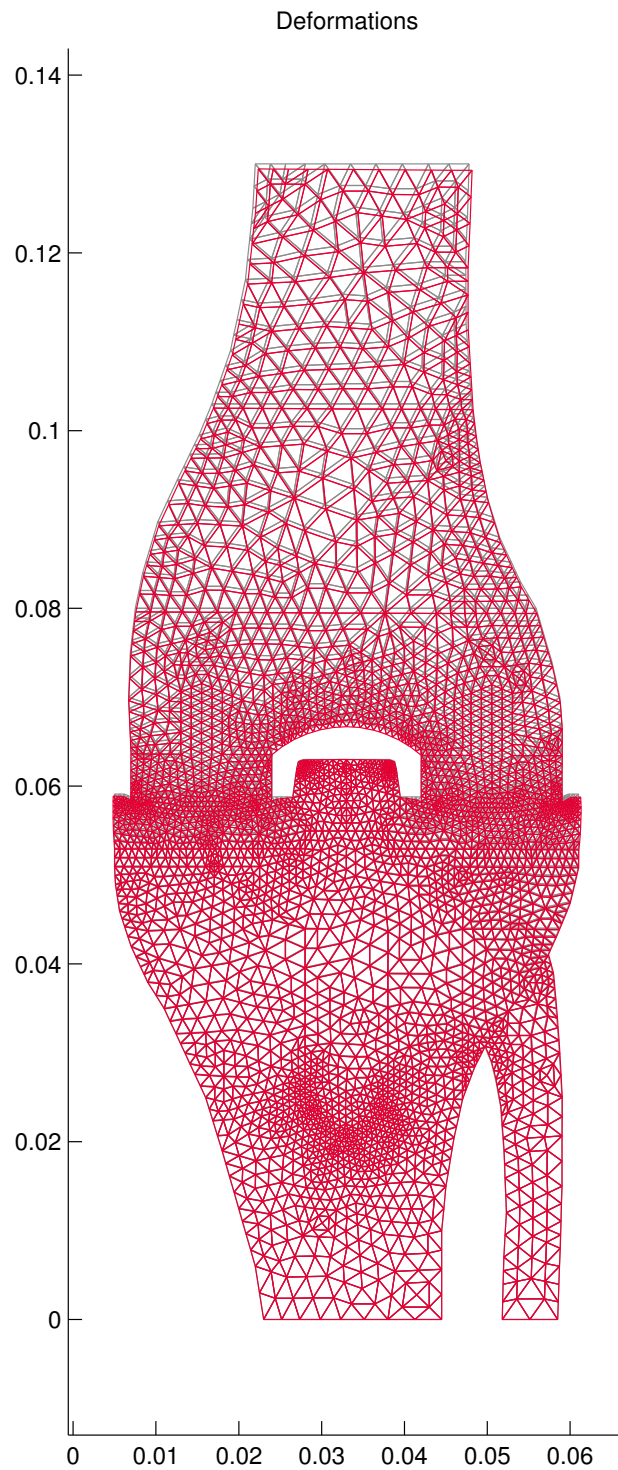


Figure 56: Model I - Deformations (enlarge factor=20)

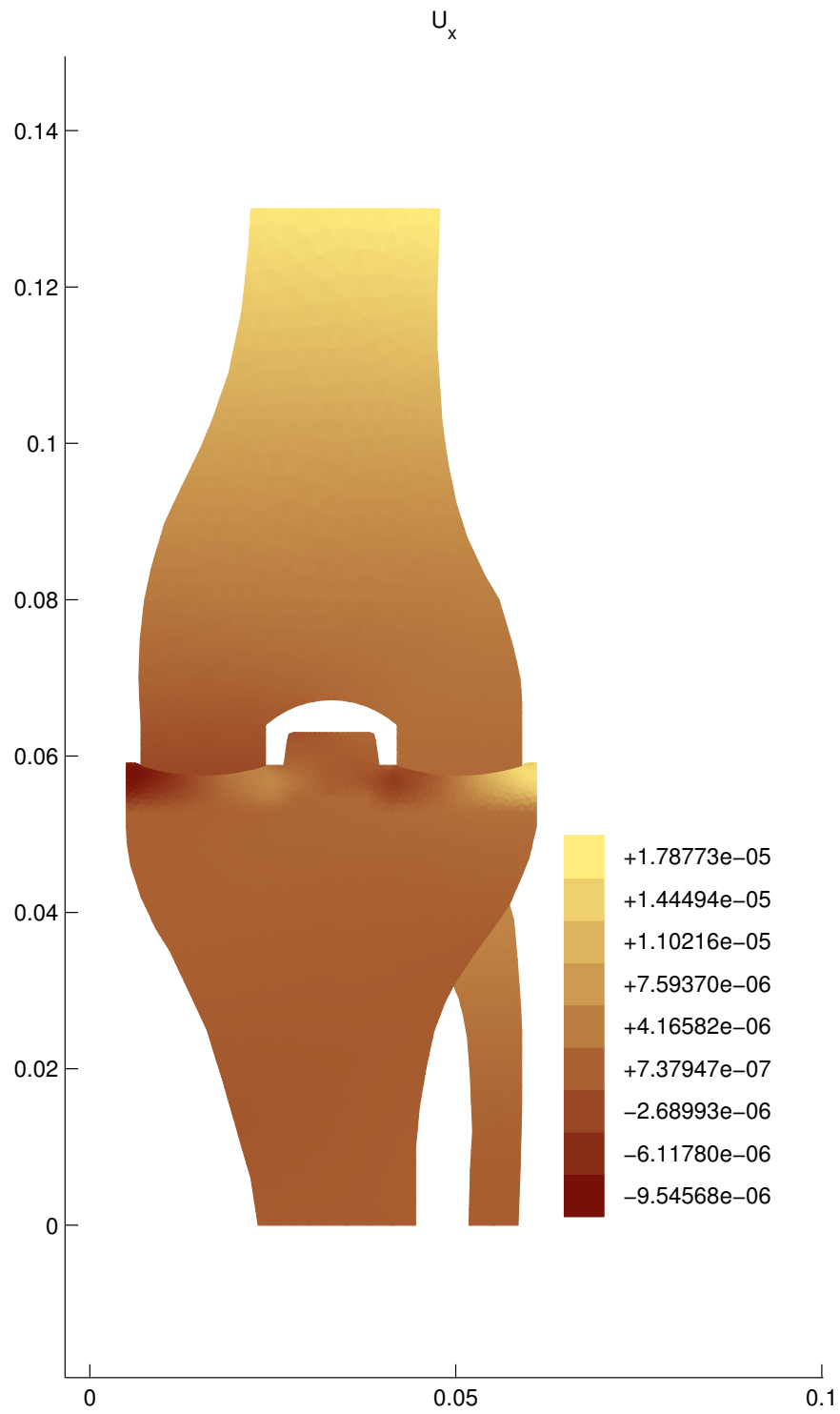


Figure 57: Model I - Horizontal component of displacement

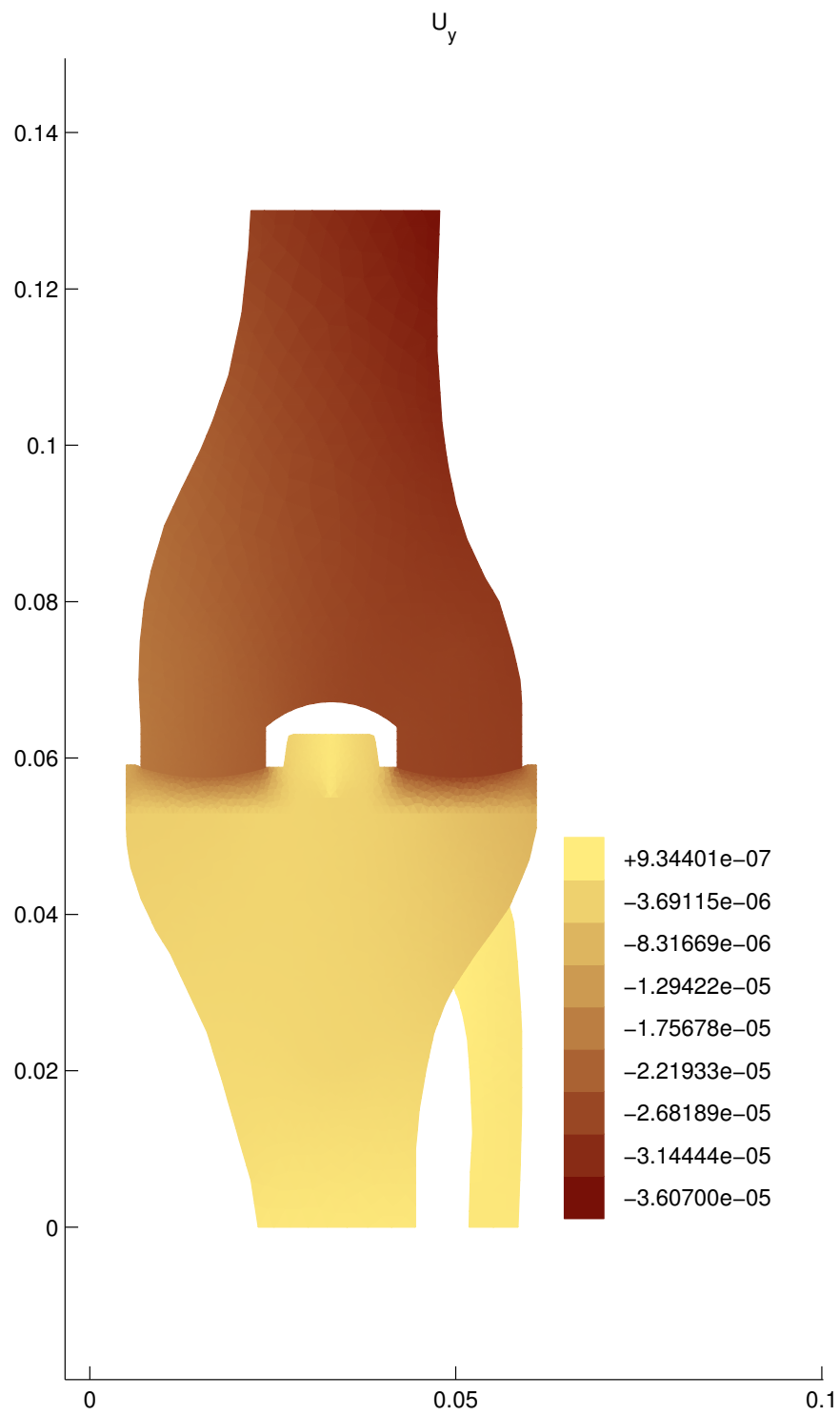


Figure 58: Model I - Vertical component of displacement

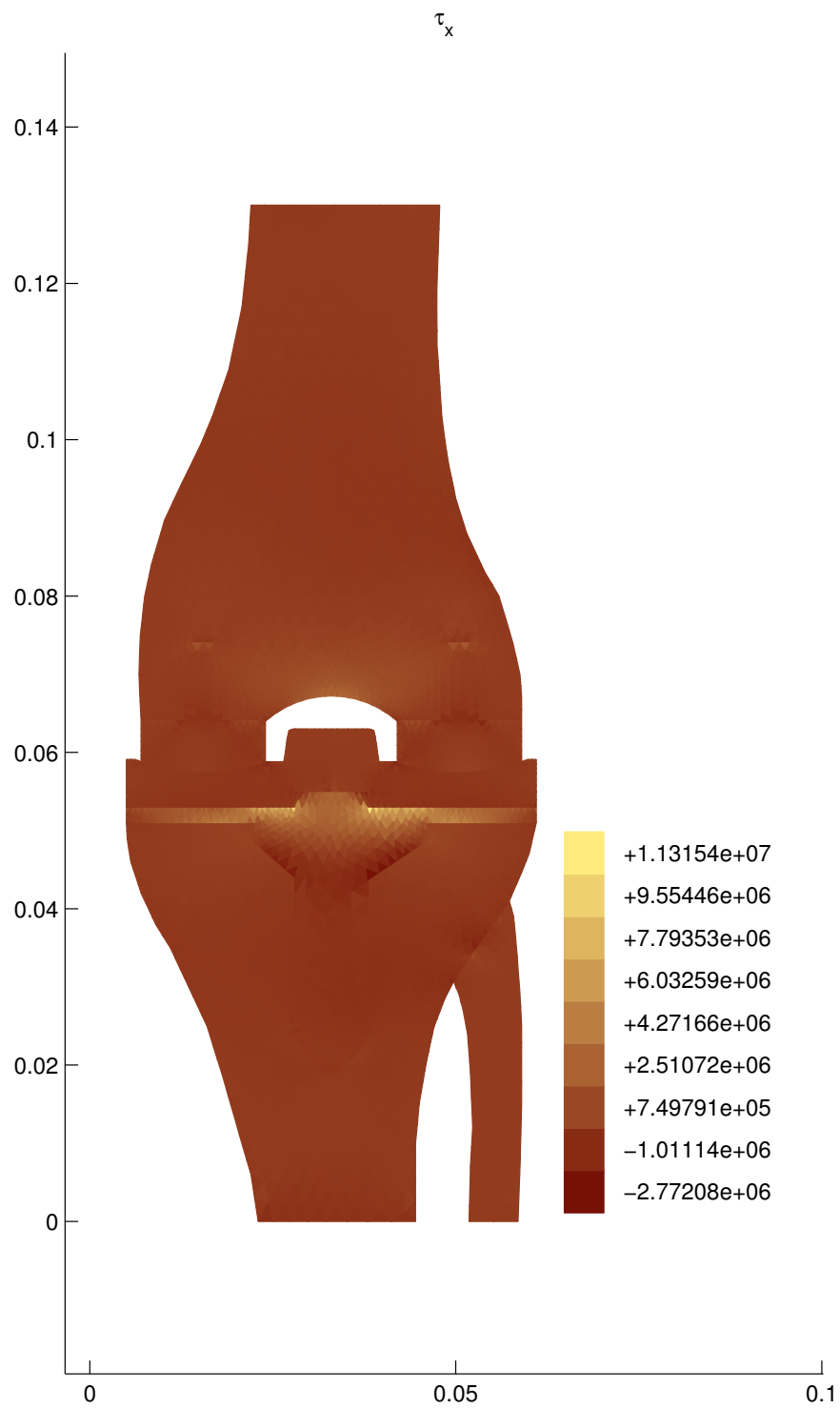


Figure 59: Model I - Stresses τ_x

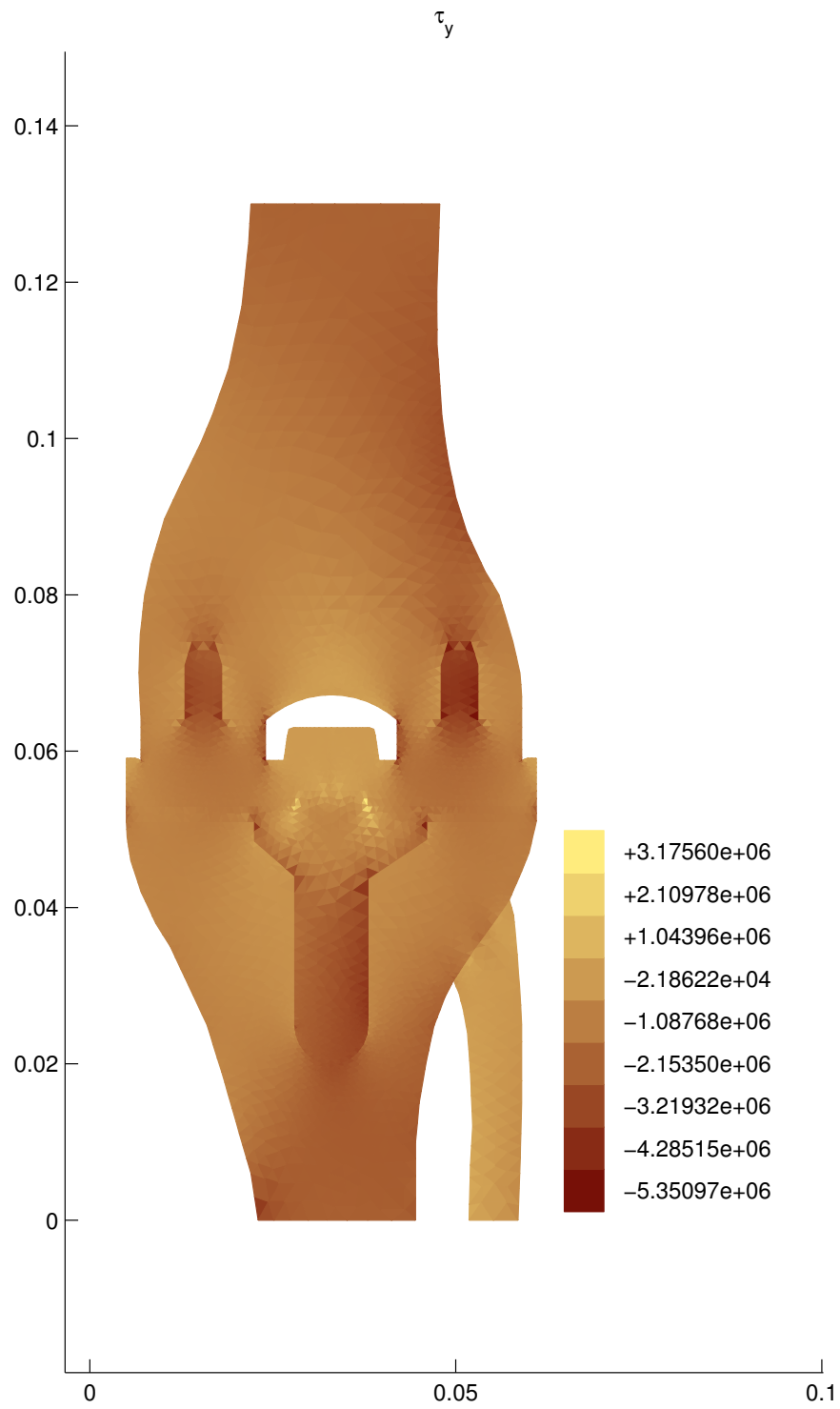


Figure 60: Model I - Stresses τ_y

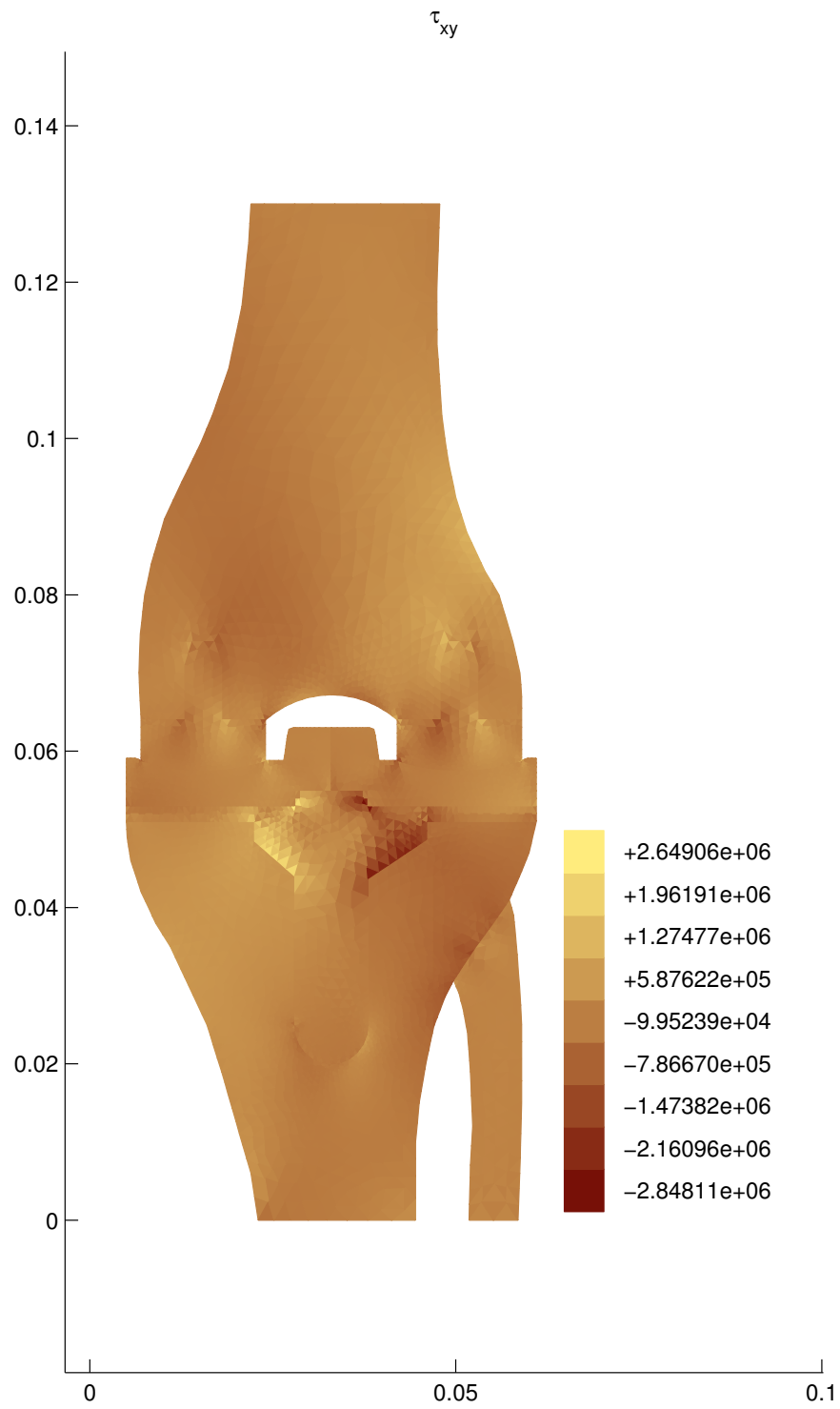


Figure 61: Model I - Stresses τ_{xy}

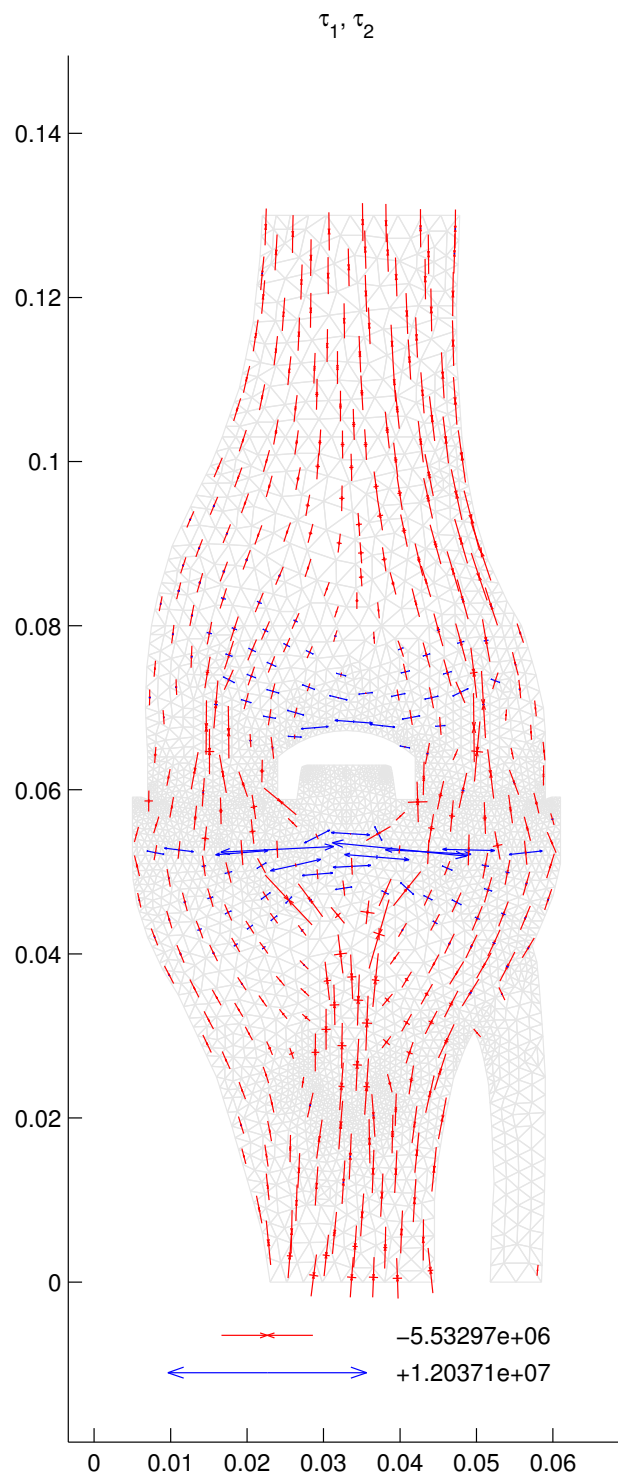


Figure 62: Model I - Principal stresses

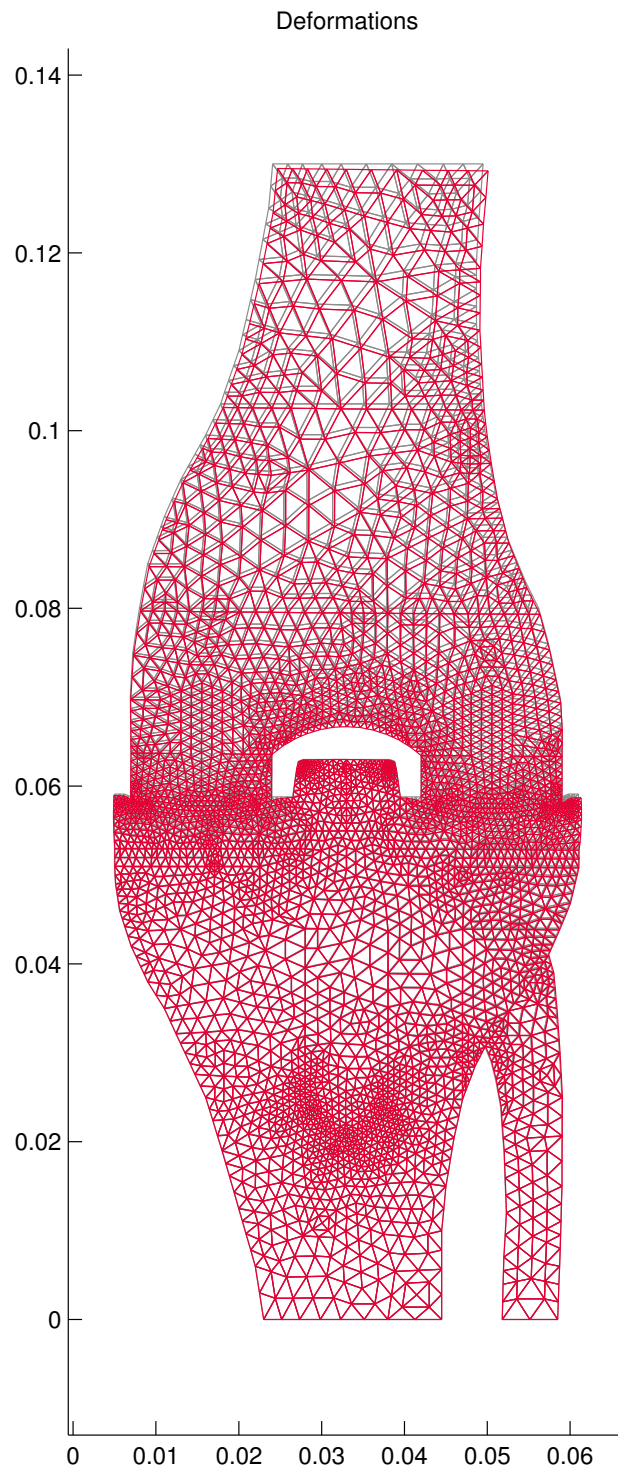


Figure 63: Model II - Deformations (enlarge factor=20)

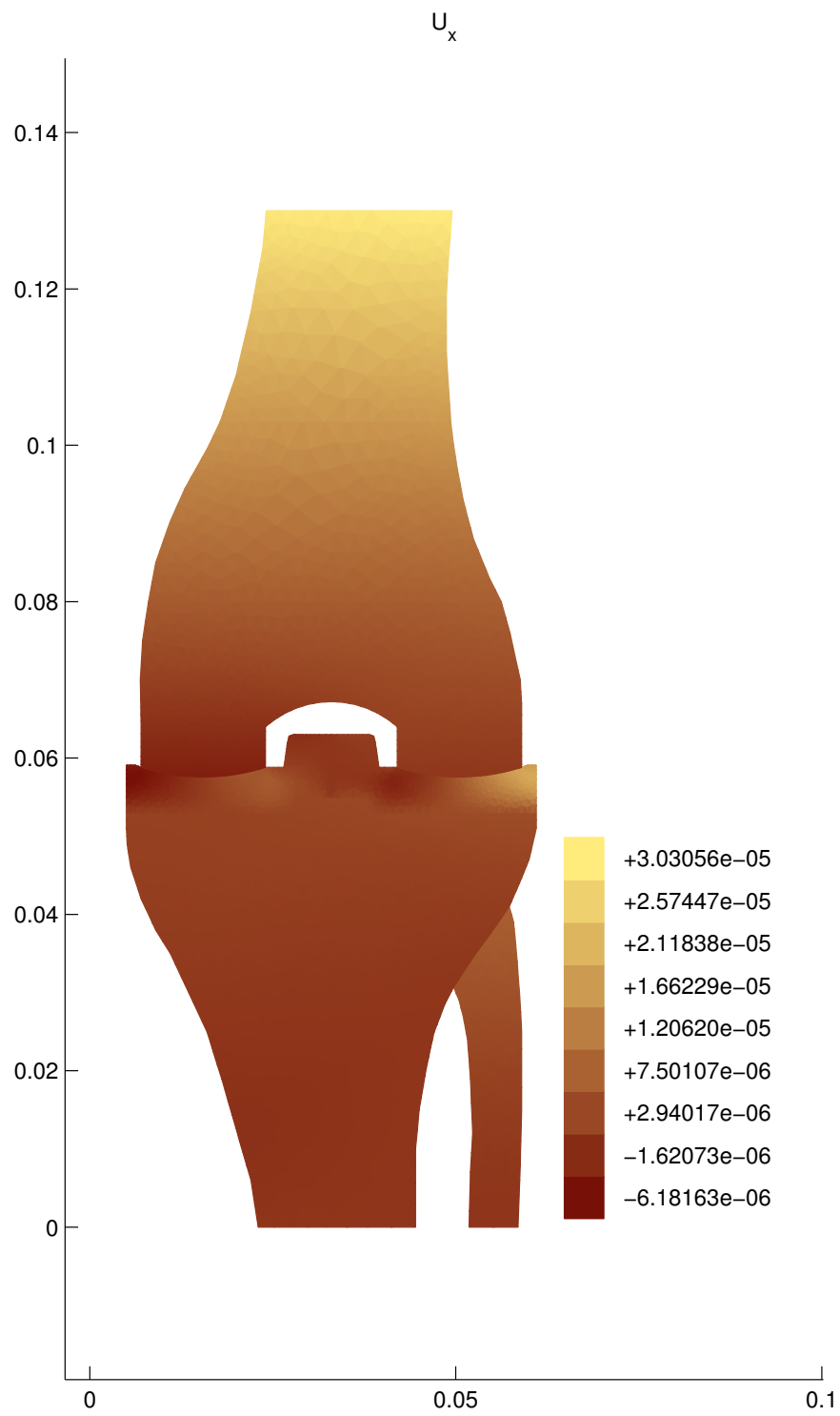


Figure 64: Model II - Horizontal component of displacement

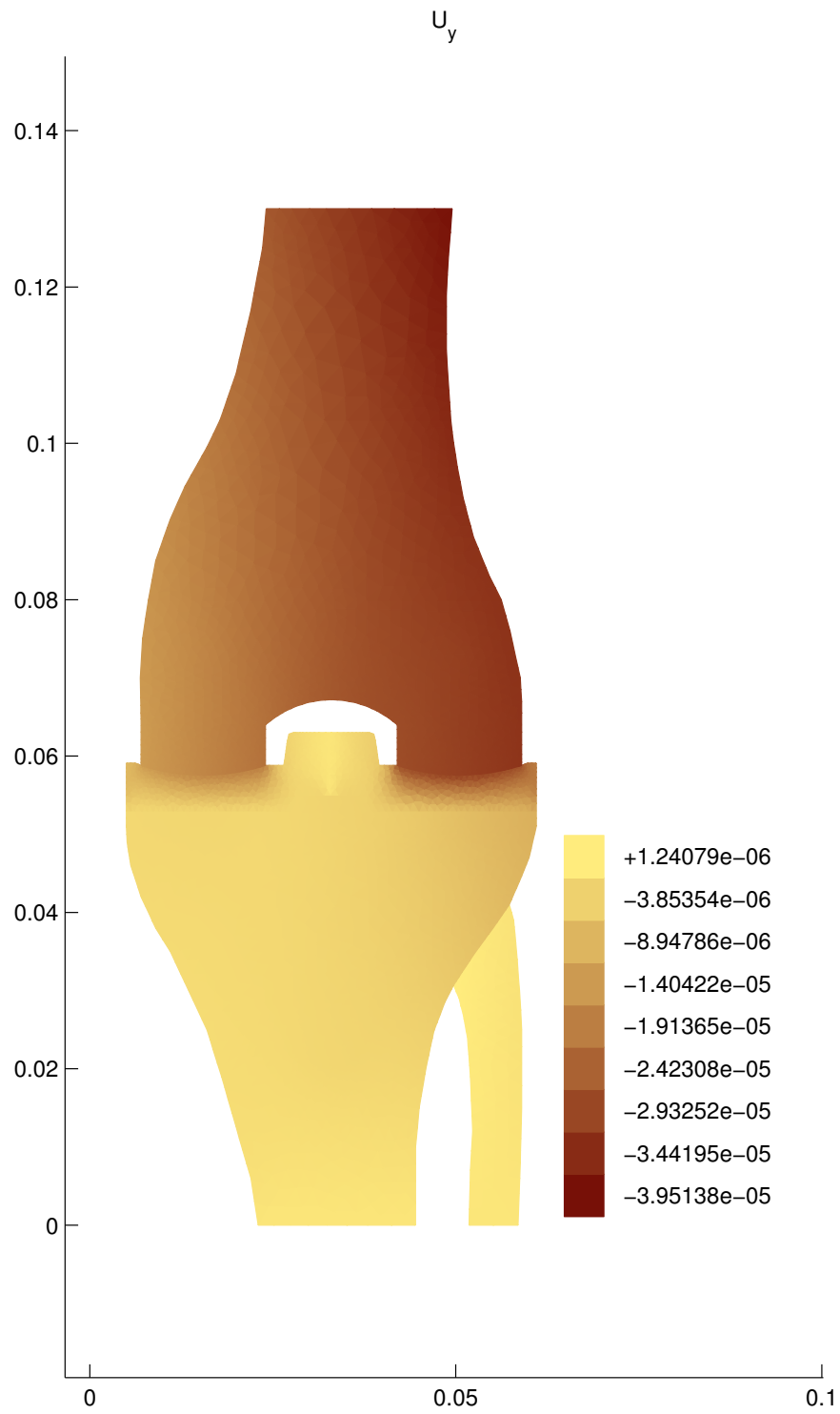


Figure 65: Model II - Vertical component of displacement

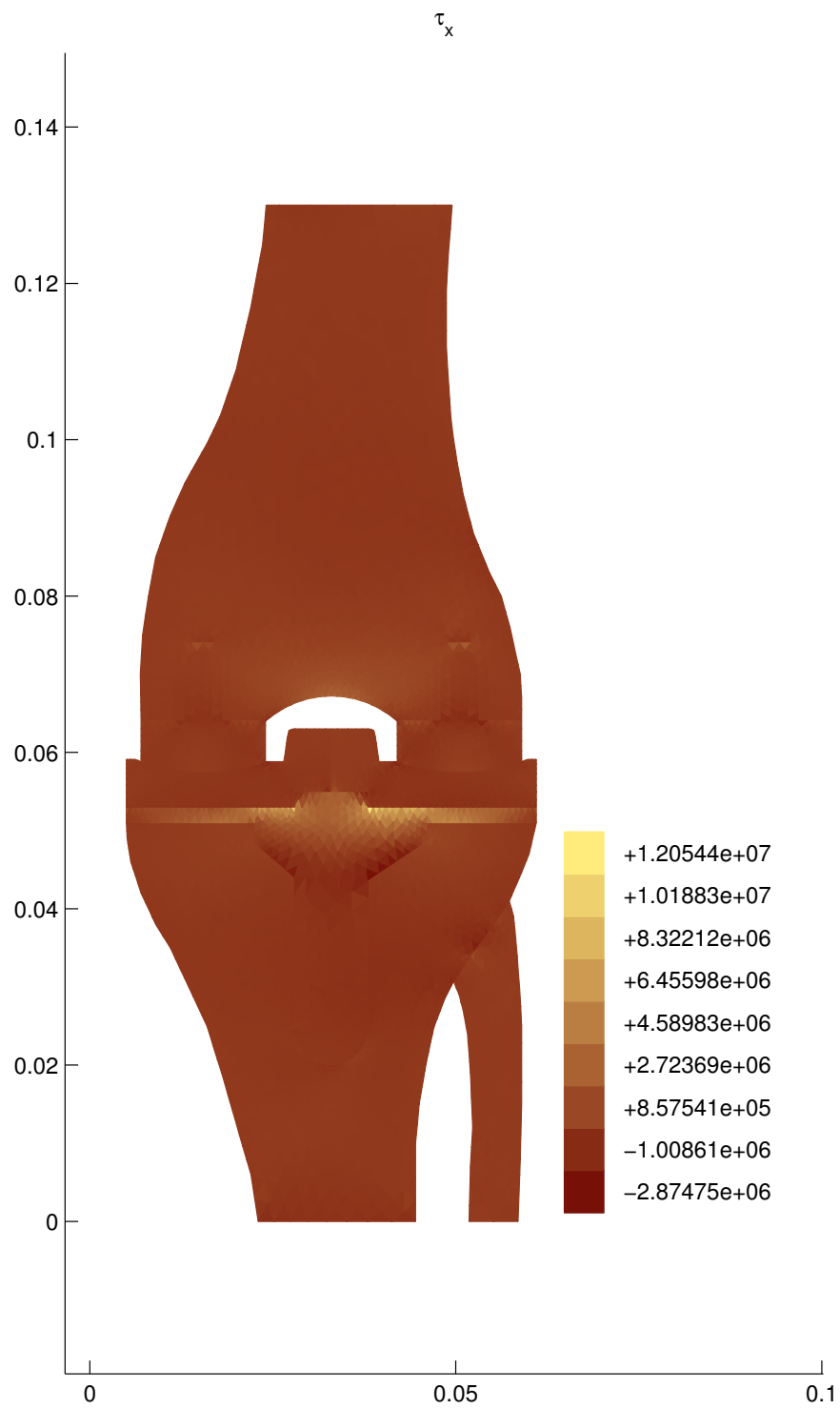


Figure 66: Model II - Stresses τ_x

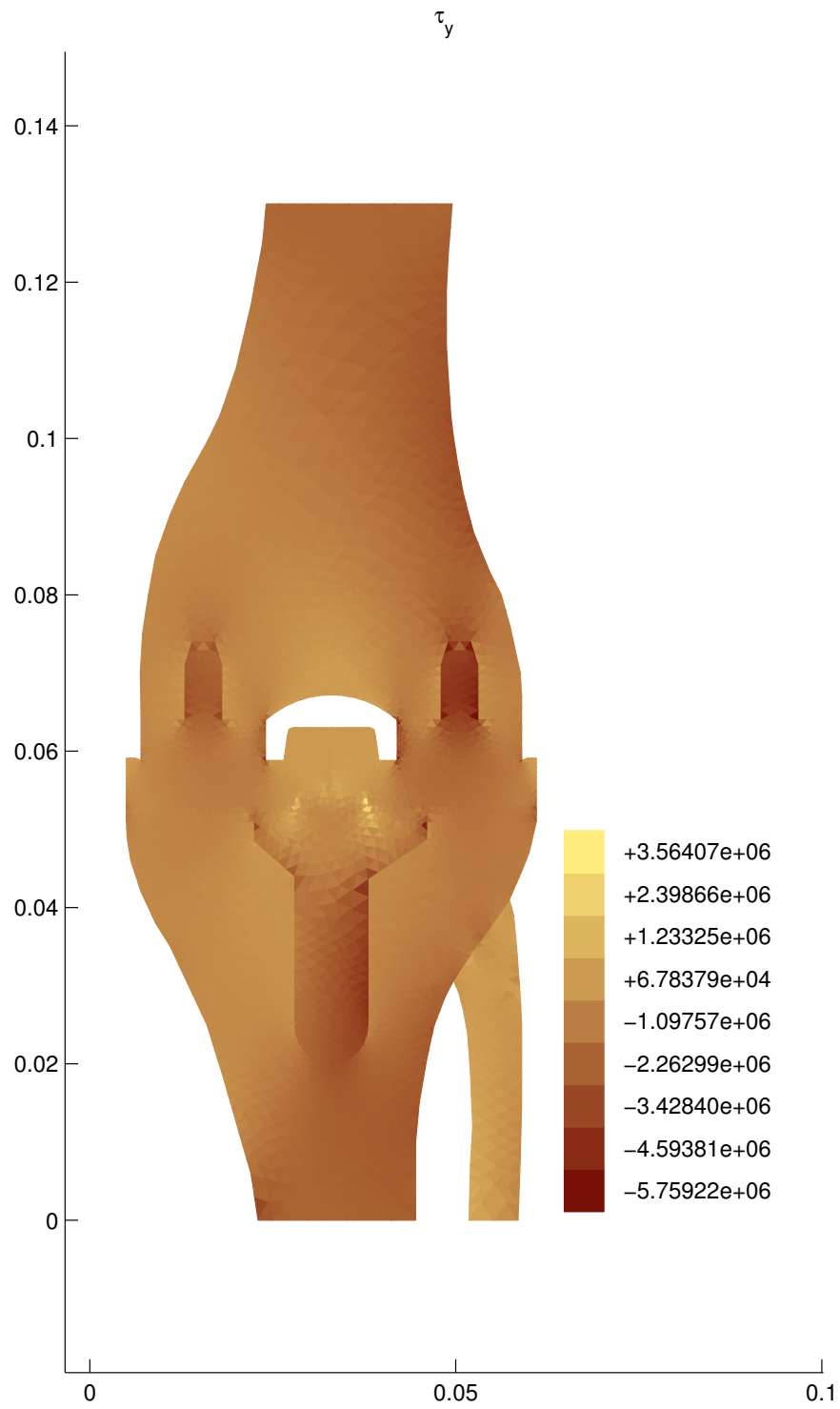


Figure 67: Model II - Stresses τ_y

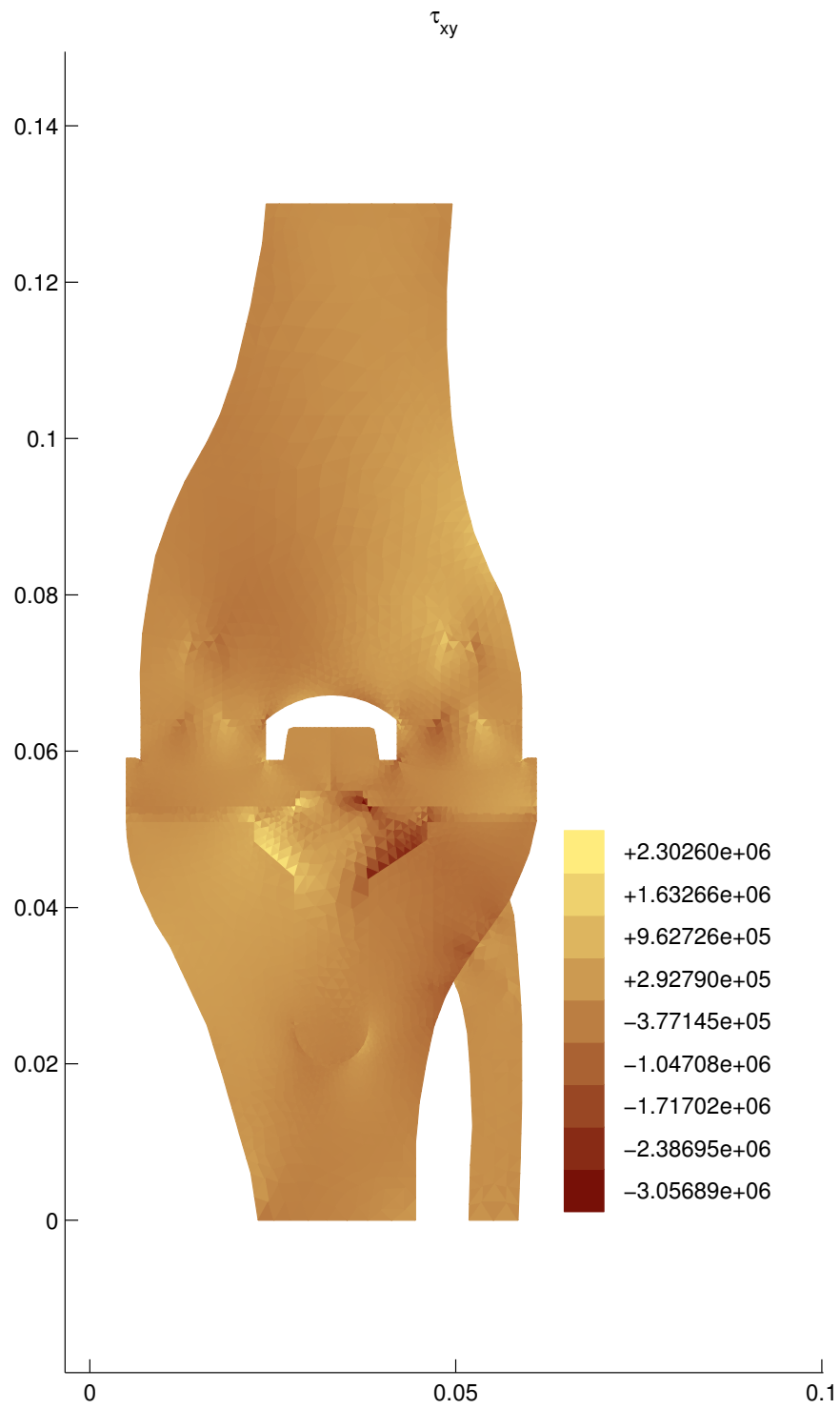


Figure 68: Model II - Stresses τ_{xy}

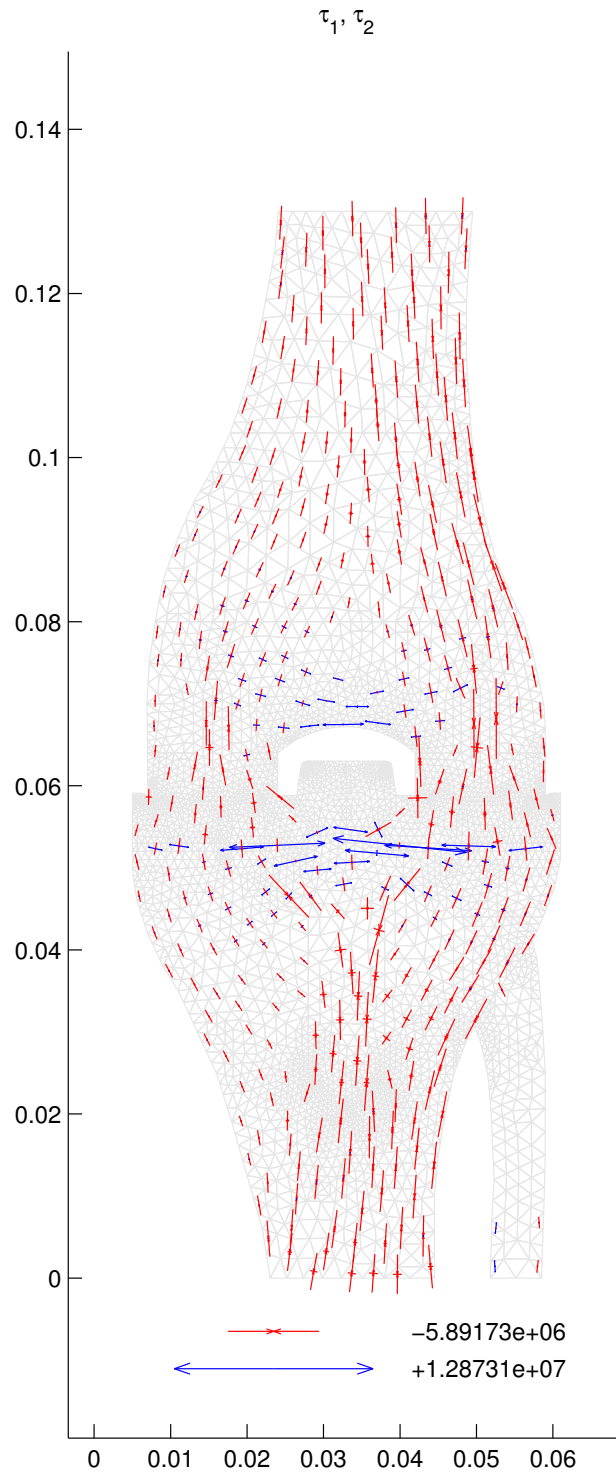


Figure 69: Model II - Principal stresses

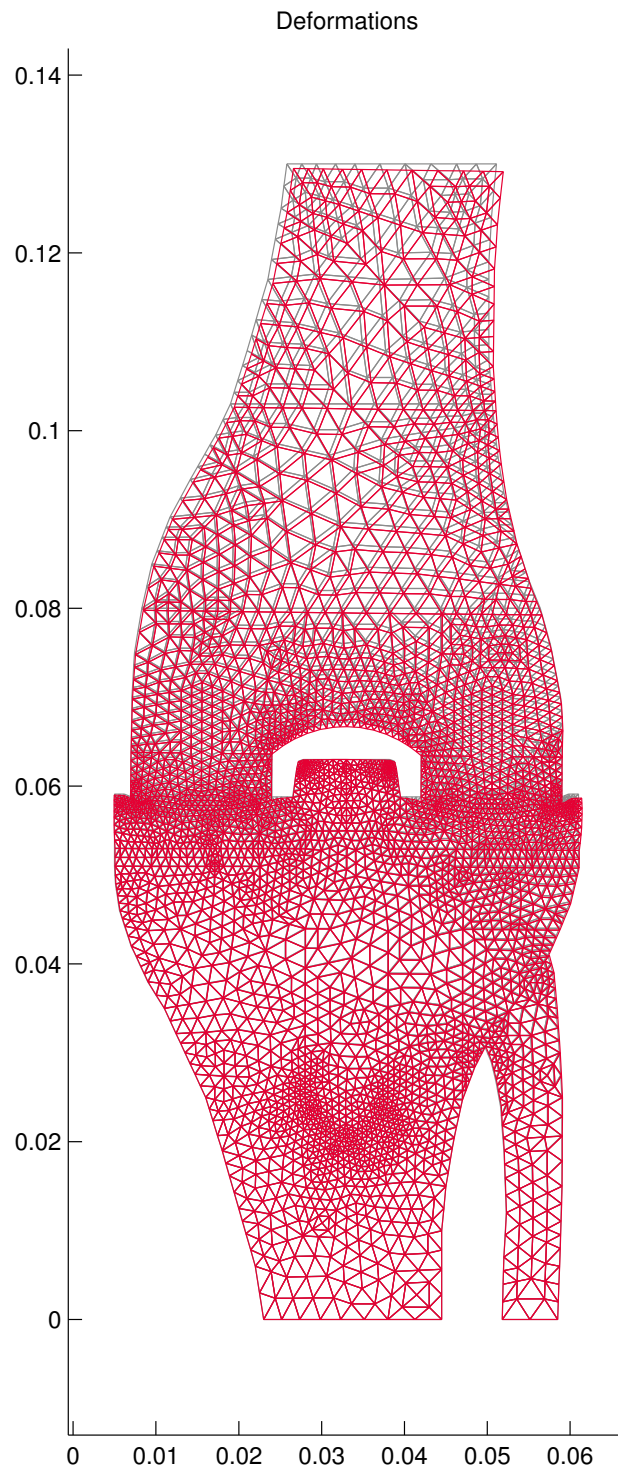


Figure 70: Model III - Deformations (enlarge factor=20)

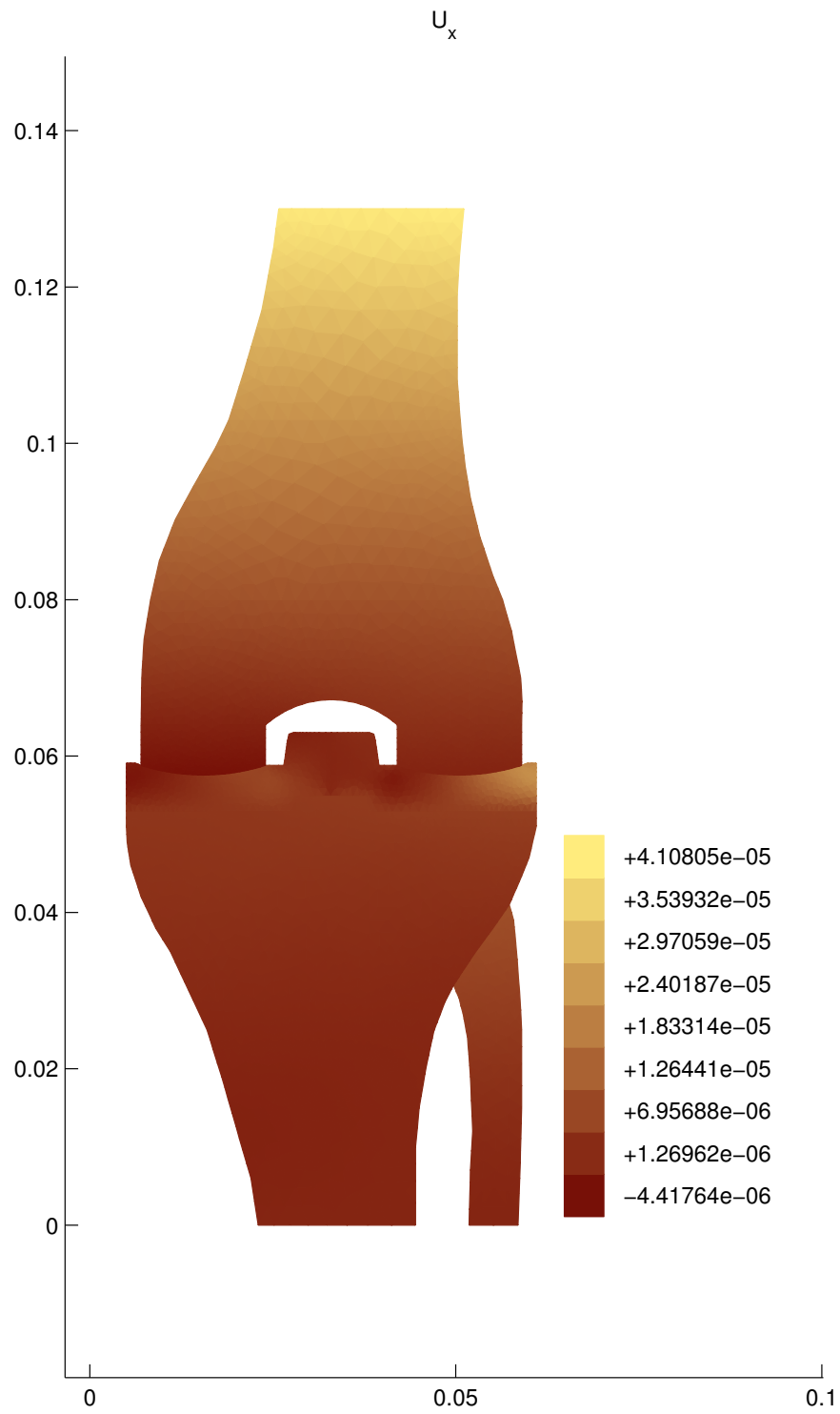


Figure 71: Model III - Horizontal component of displacement

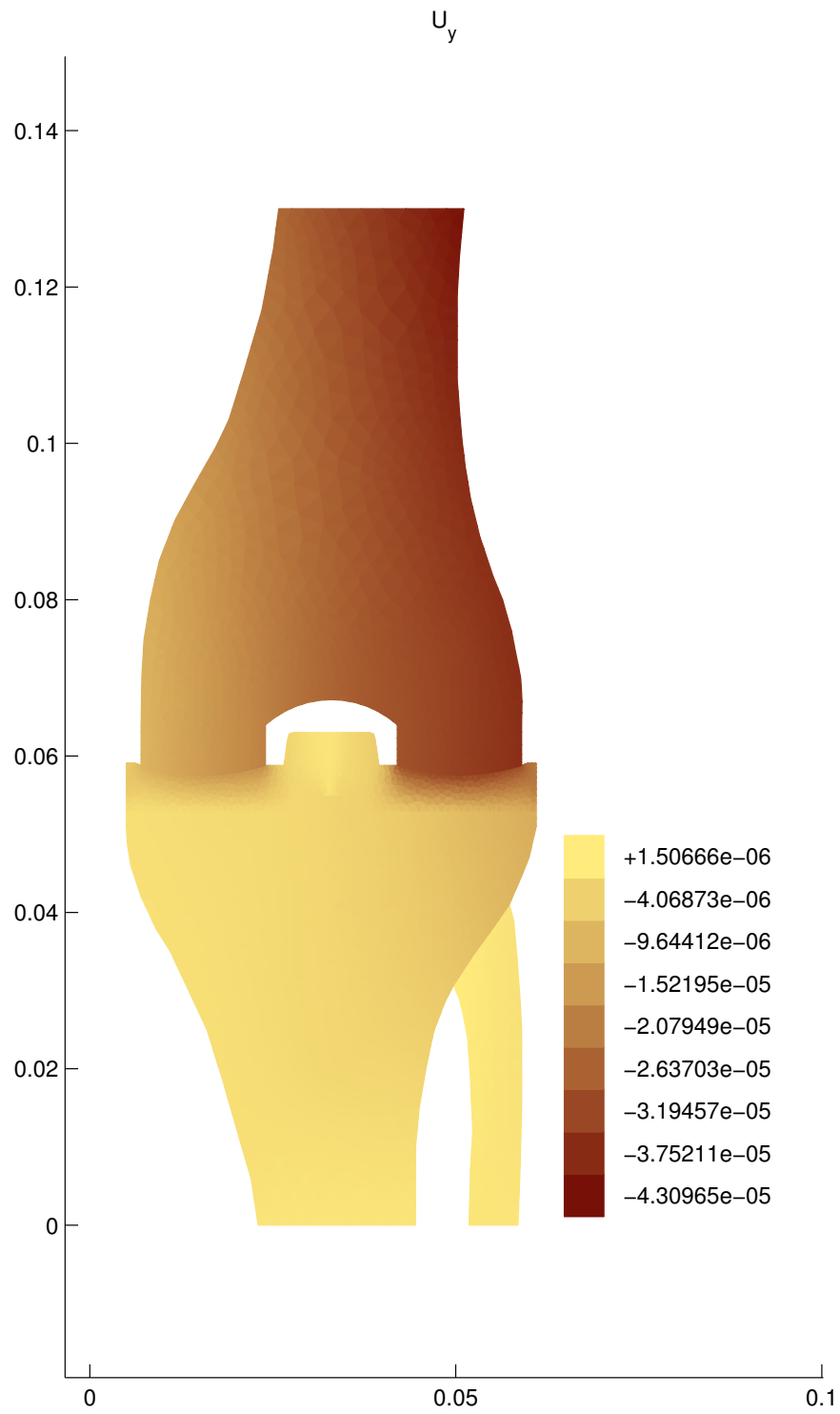


Figure 72: Model III - Vertical component of displacement

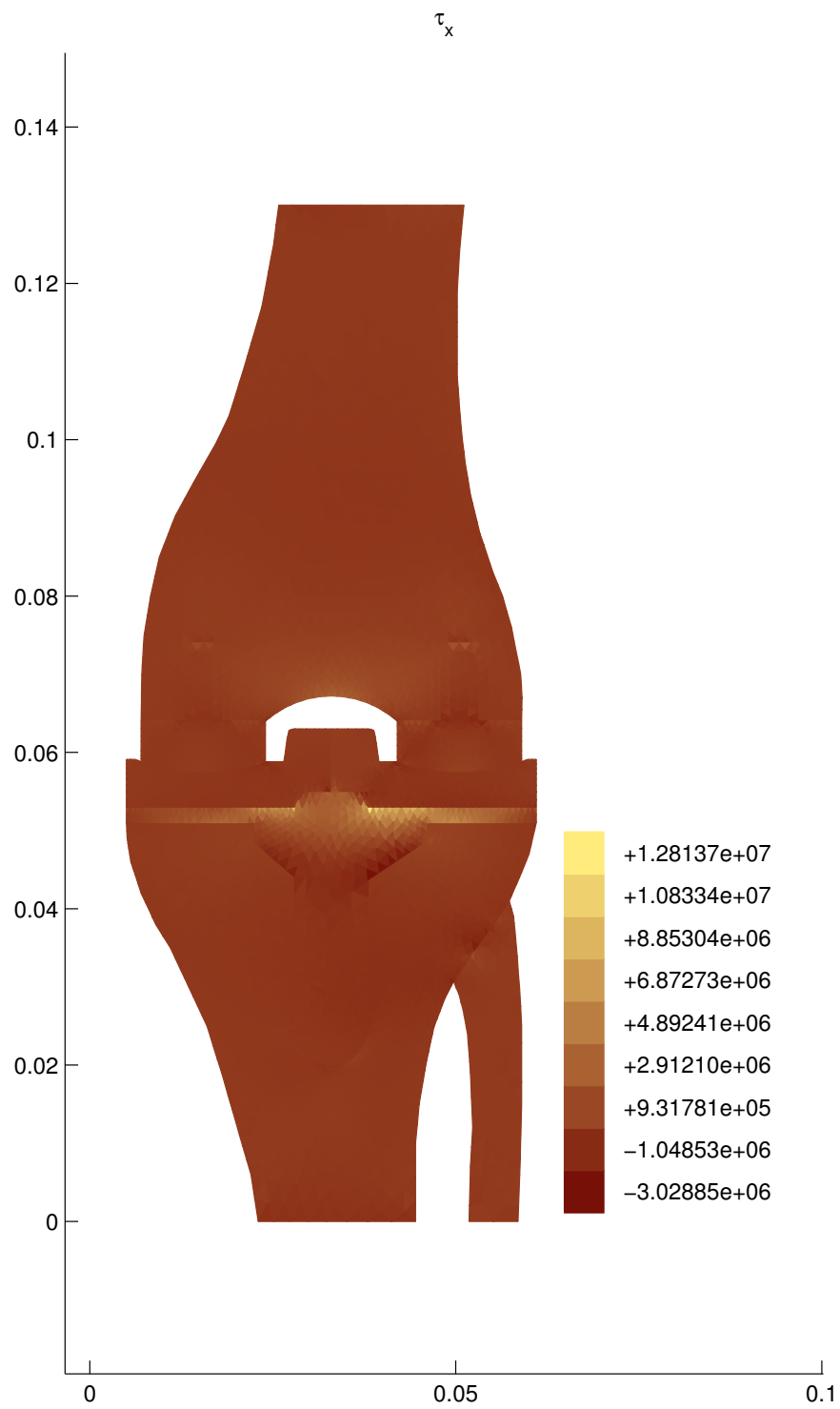


Figure 73: Model III - Stresses τ_x

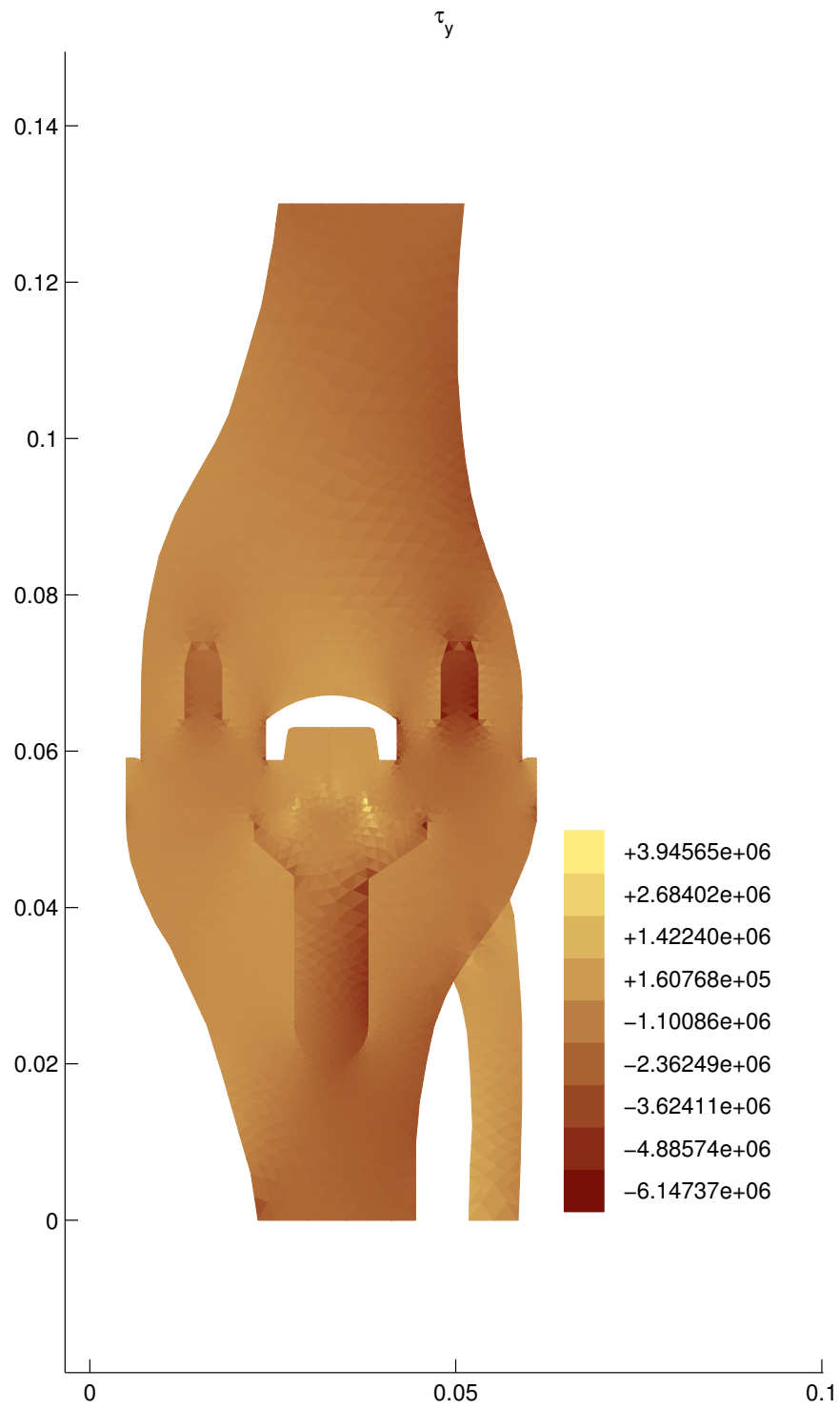


Figure 74: Model III - Stresses τ_y

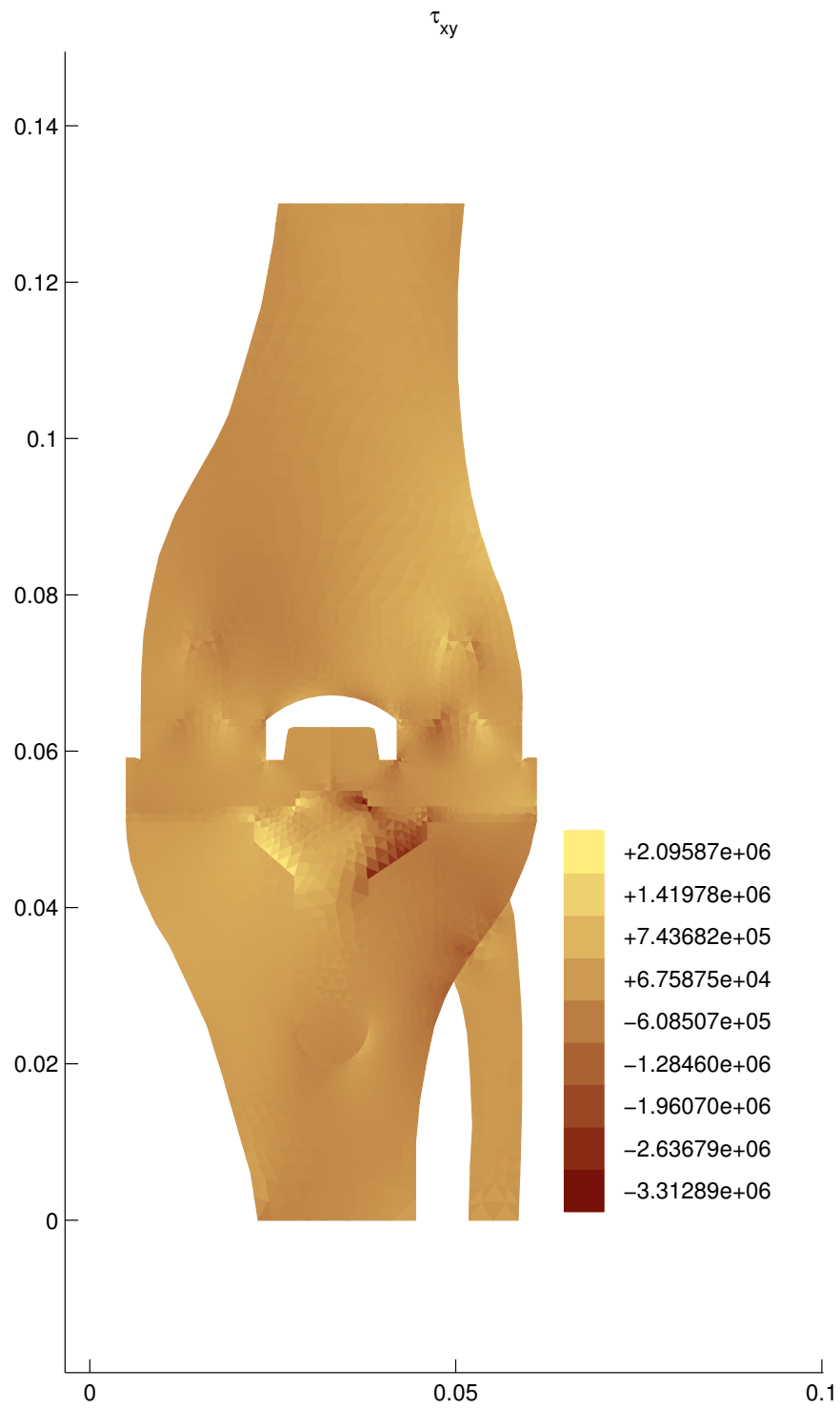


Figure 75: Model III - Stresses τ_{xy}

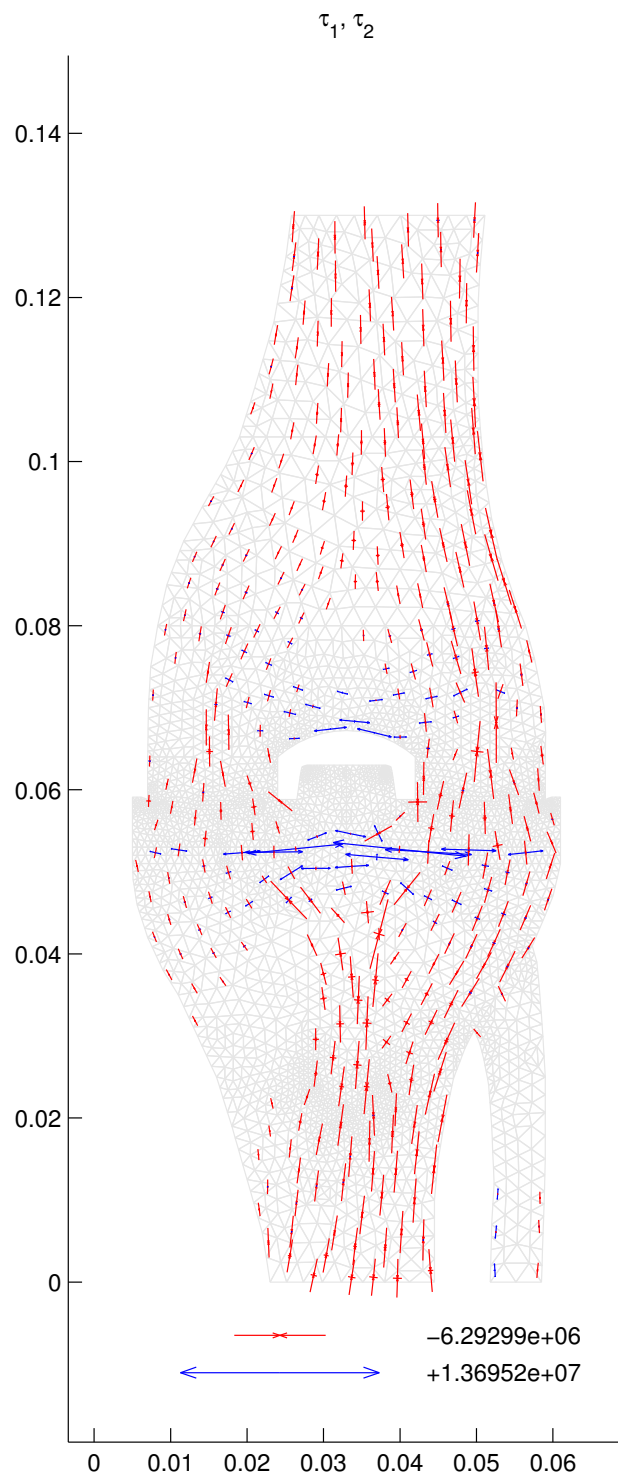


Figure 76: Model III - Principal stresses