Continuum Elastoplasticity - Finite Strain

Constrained tension example

Domain: $5 \times 1 \times 1$
Mesh: $420 \times 8 \times 8$ (non-uniform spacing)
Boundary conditions: $\boldsymbol{u} = 0$ at $x_1 = 0$; $u_1 = 0.1$ at $x_1 = 5$

Parameter	Value
Lamé constant λ	100.6582e9
Lamé constant μ	45.6473e9
Yield stress	33.014025e6
Linear hardening coefficient	100
Basis function order	1
Quadrature order	2
Pseudo-time steps	400

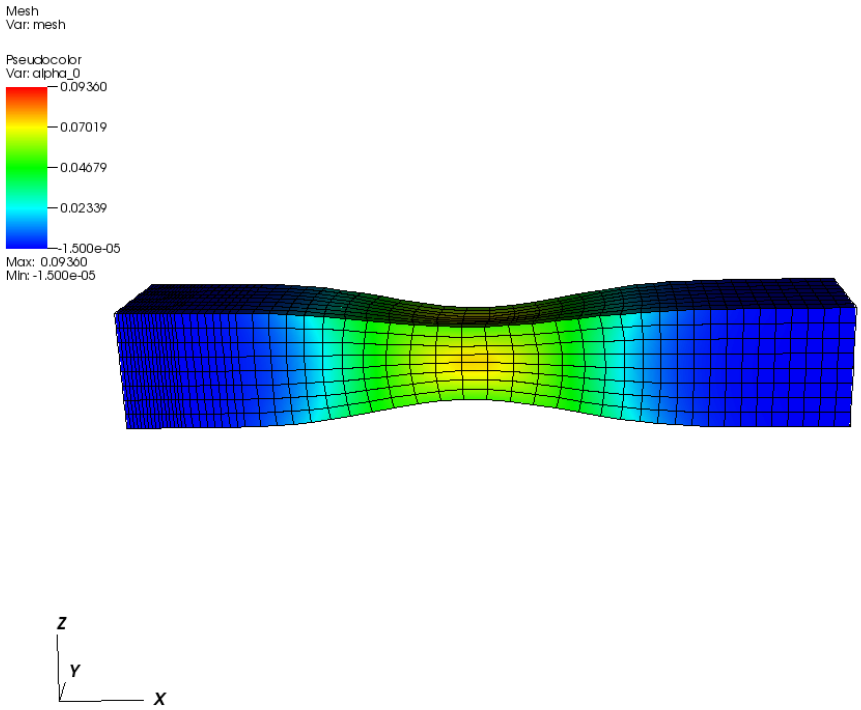

Figure 1: Plot of equivalent plastic strain, α. Deformation scaled by $10\times$.

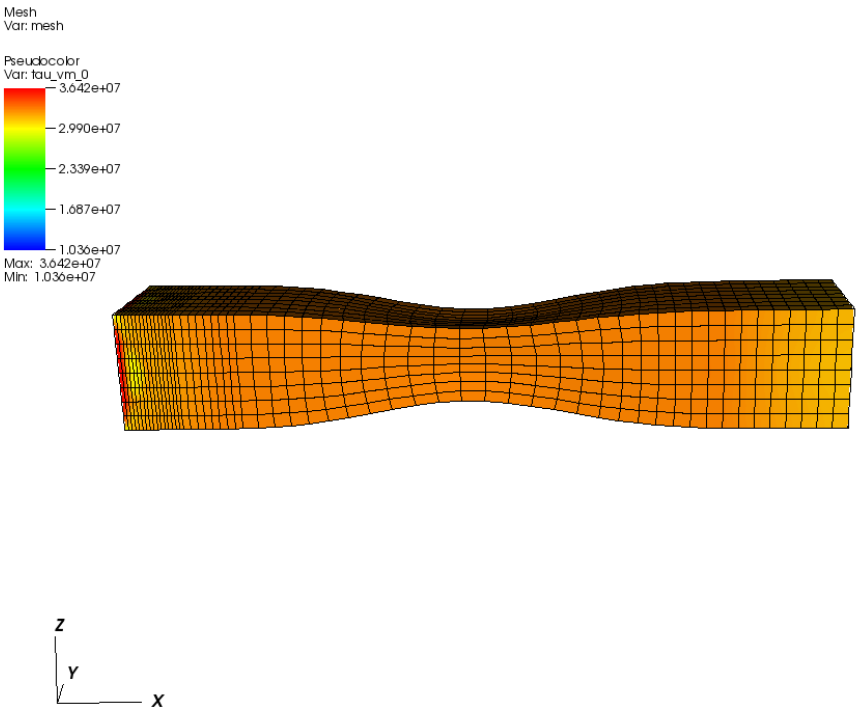

Figure 2: Plot of von Mises stress. Deformation scaled by 10×.

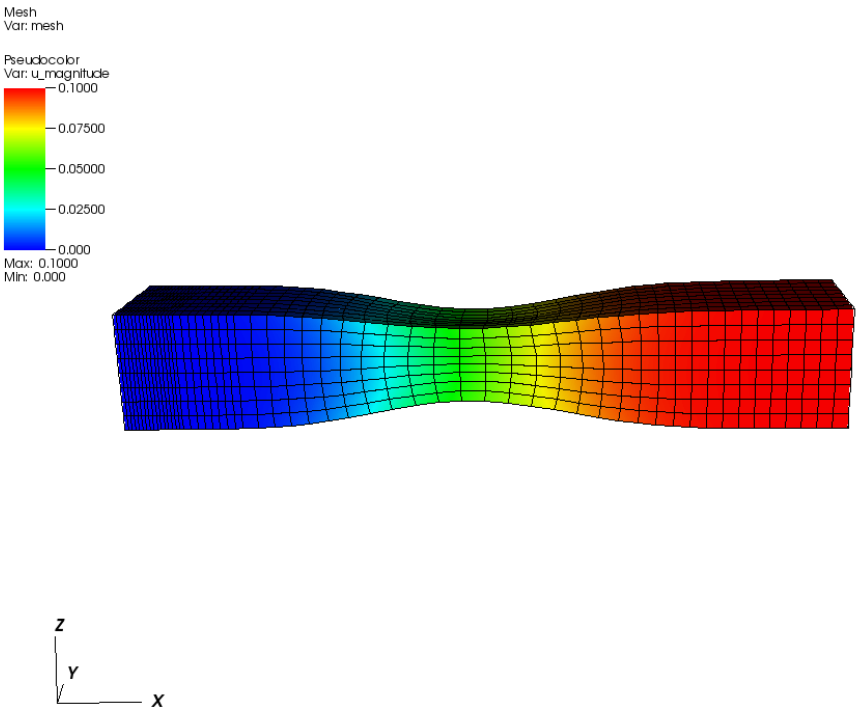

Figure 3: Plot of displacement magnitude. Deformation scaled by $10\times$.

Domain: $5 \times 1 \times 1$
Mesh: $420 \times 8 \times 8$ (non-uniform spacing)
Boundary conditions: $\boldsymbol{u} = 0$ at $x_1 = 0$; $u_1 = 0.5$ at $x_1 = 5$

Parameter	Value
Lamé constant λ	100.6582e9
Lamé constant μ	45.6473e9
Yield stress	33.014025e6
Linear hardening coefficient	2.0259e9
Basis function order	1
Quadrature order	2
Pseudo-time steps	200

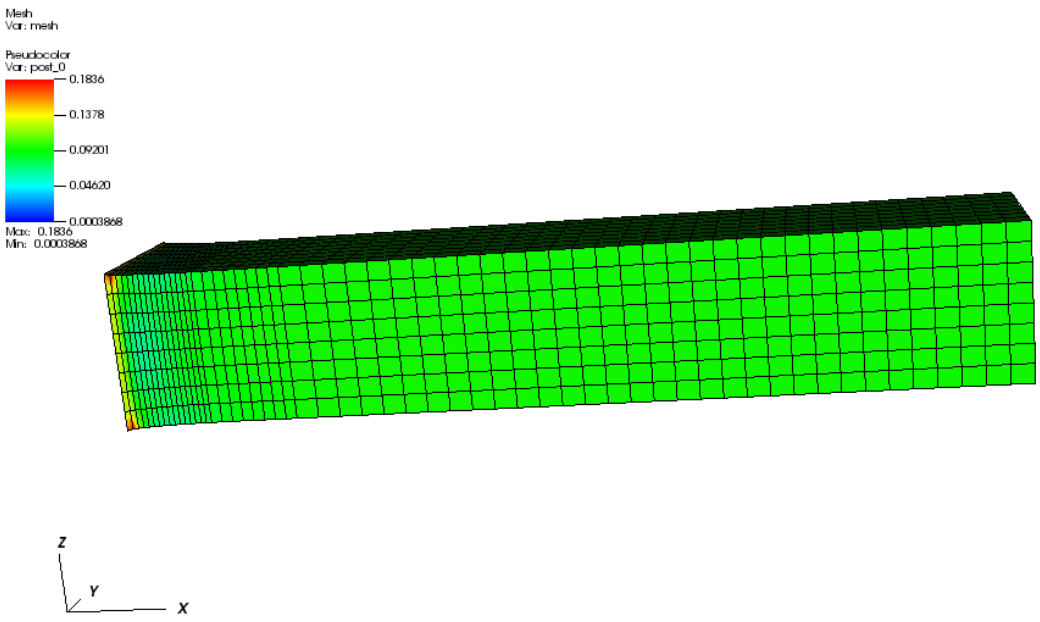

Figure 4: Deformation scaled by 1×.