Appendix:

The system of units is proposed by: s (time), mm (length), kg (mass)

Proposed mechanical parameters for material are given in Table 1:

Table1 Mechanical parameters

K (MPa.s^m)	m	n	σ_Y (MPa)	v	E (MPa)
252	0.2	0.25	20	0.3	25000

By considering the initial length of the work zone l_0= 50 mm, $v = 5.10^{-6}\mathrm{m/s}$

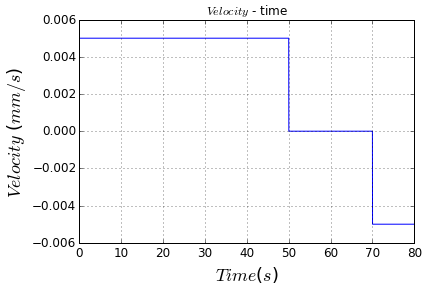
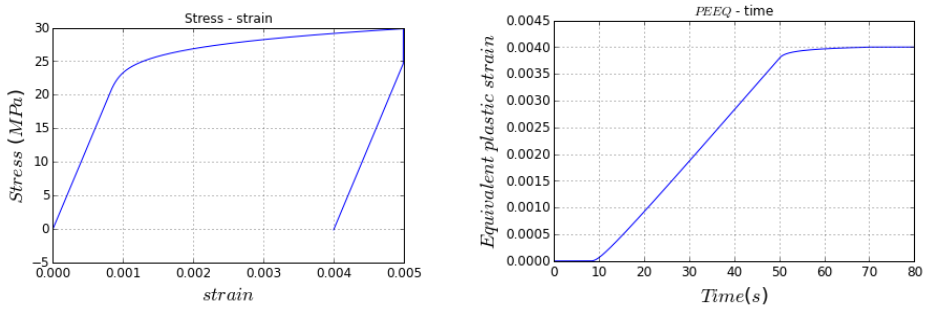


Figure 1: Applied velocity



a) Evolution of stress vs total strain b) Evolution of equivalent plastic strain vs time

Figure 2: Results based on the Python code for 1D EVP solver (the multiplicative form)

The additive form of relationship between the von Mises stress, the generalized strain and the generalized strain rate takes the form

$$\bar{\sigma} = \sigma_Y + R + K(\sqrt{3})^{m+1}\dot{\bar{\varepsilon}}^m$$

where $R = H\bar{\varepsilon}^n$ (H = 1000 MPa) is defined for the power law, or $R = Q(1 - \exp(-\beta\bar{\varepsilon}))$ is defined for the exponential law (Q = 159 MPa, β = 9) in this TP.