

Numerical example

2-D deformation controlled phase transformation process of a strip made of a shape memory alloy that may exist in many martensitic variants \mathbf{D}_i , $i = 1, 2, 3, 4$.

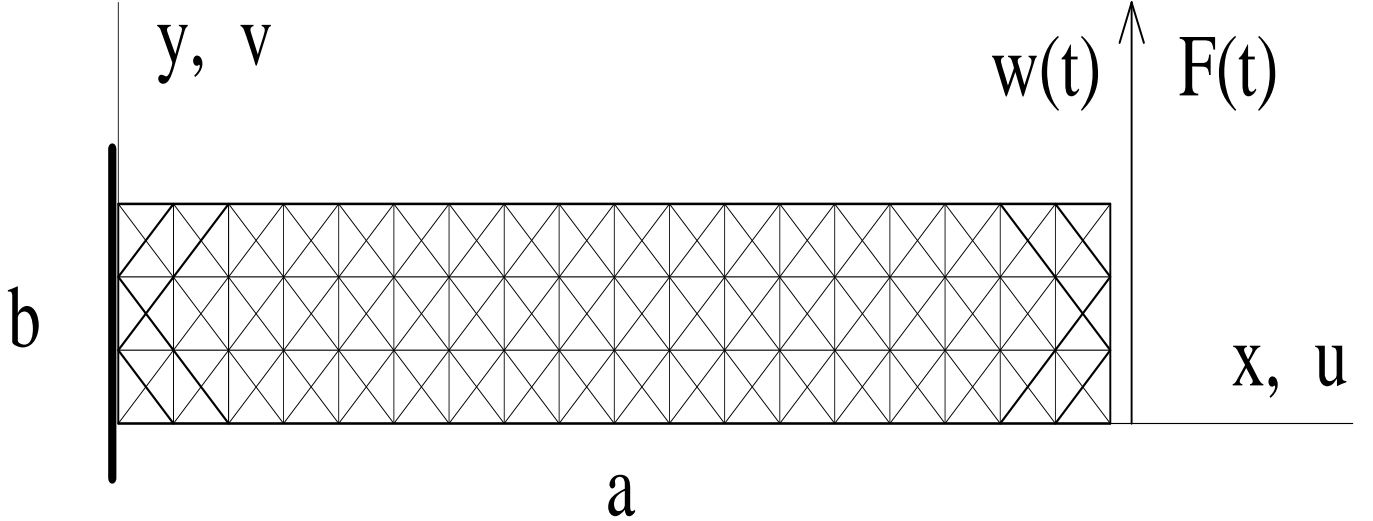


Figure 1: Strip made of multiphase material, $a:b=6:1$, quasi-statically loaded by displacement $w(t)$.

4 from 6 possible variants of martensite in the phase transformation of the *Cu-Al-Ni* alloy, (*cubic* \rightarrow *orthorhombic*), are here relevant:

$$\mathbf{D}_1 = \begin{bmatrix} 0.04245 & 0 \\ 0 & -0.09620 \end{bmatrix}, \quad \mathbf{D}_2 = \begin{bmatrix} 0.04245 & 0.01945 \\ 0.01945 & 0.04245 \end{bmatrix},$$

$$\mathbf{D}_3 = \begin{bmatrix} 0.04245 & -0.01945 \\ -0.01945 & 0.04245 \end{bmatrix}, \quad \mathbf{D}_4 = \begin{bmatrix} -0.09620 & 0 \\ 0 & 0.04245 \end{bmatrix}.$$

Other data (assumed): $E = 10\,000.0$ MPa, $\nu = 0.3$, $\Delta\varpi = \varpi_i - \varpi_5 = 3.756$ J/m³,
 $B_{ii} = 0$, $B_{ij} = 0.50$ J/m³, $i, j = 1, \dots, N + 1 = 5, i \neq j$.

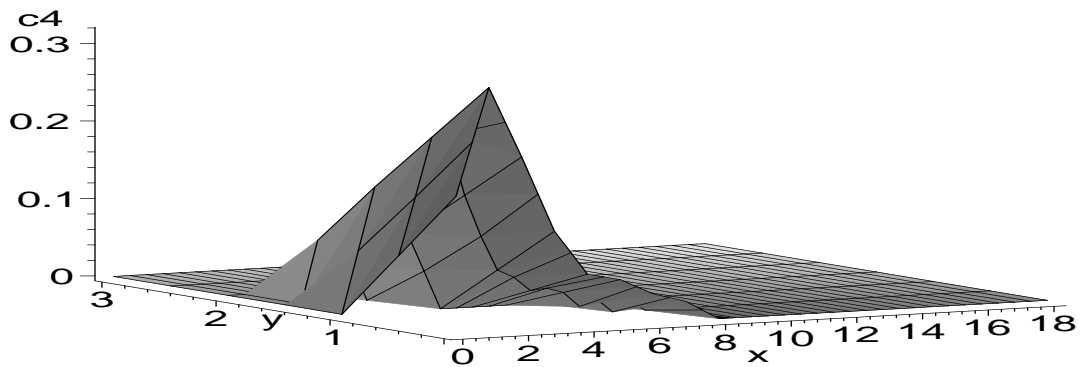
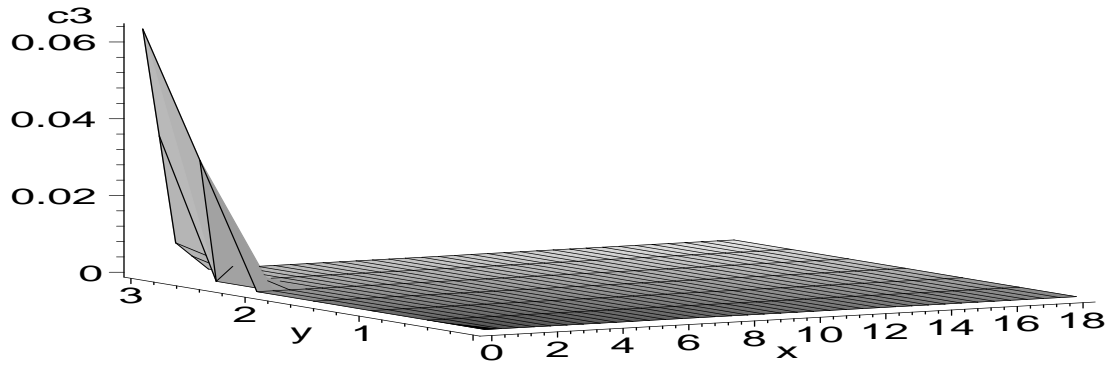
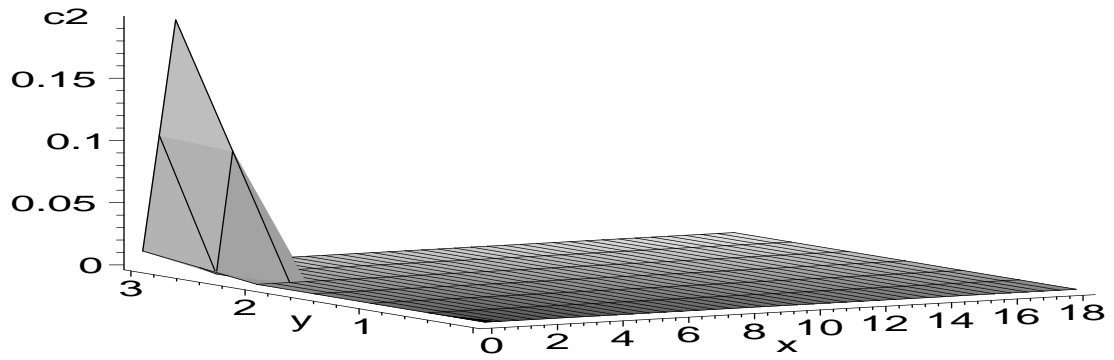
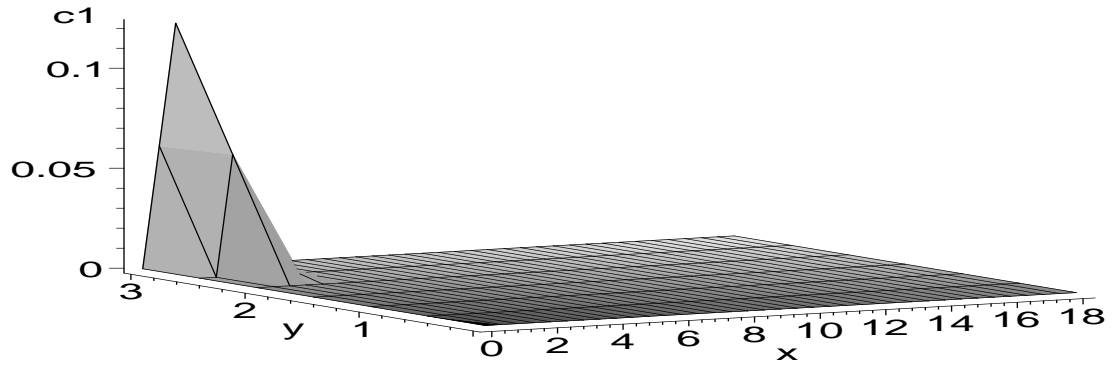


Figure 2: Distribution of volume fractions c_i of martensitic variants for $\max. w(t)$, point A on Fig. 3.

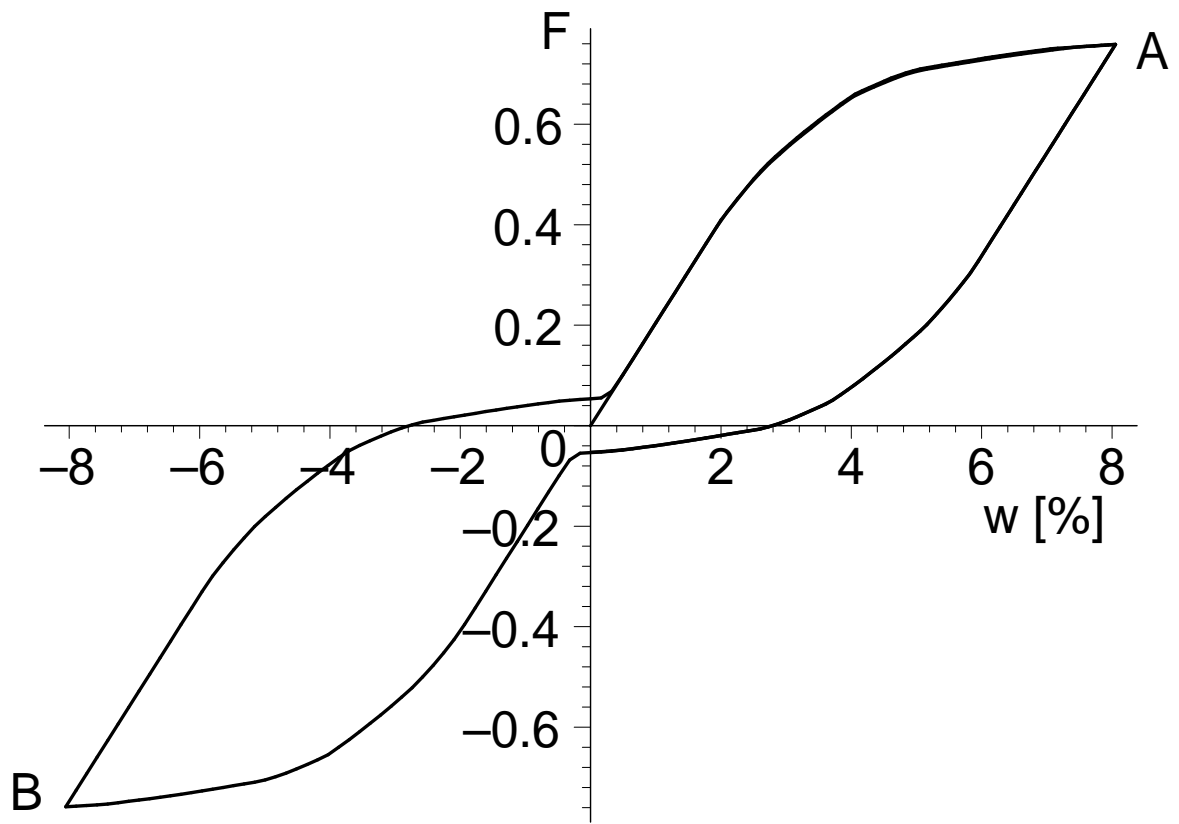


Figure 3: Histeresis loop between the scaled transverse displacement w/a and the corresponding force F on the right end.