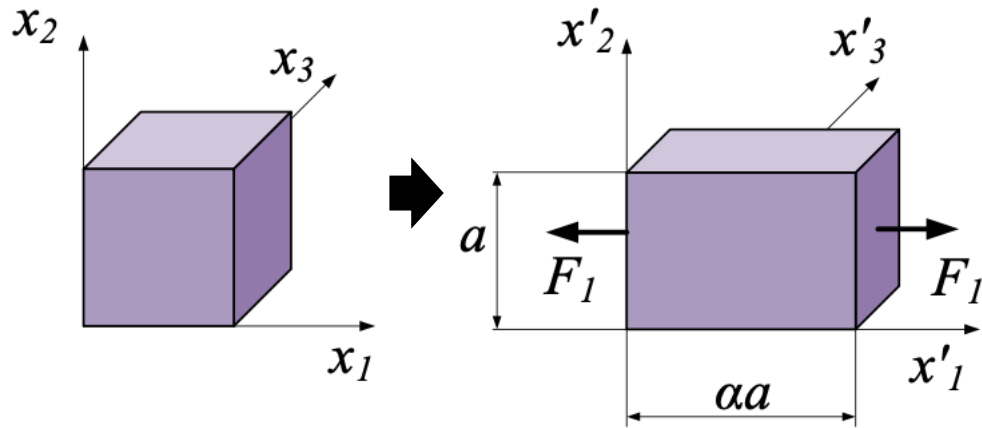


OSNOVE MEHANIKE KONTINUUMA

Dodatni zadatak

V – konst. (nestlačive deformacije)

Korak 1 (transformacija iz 1 u 2)



$$V = a^3 = \alpha a \cdot a \cdot ya \rightarrow y = \frac{1}{\alpha}$$

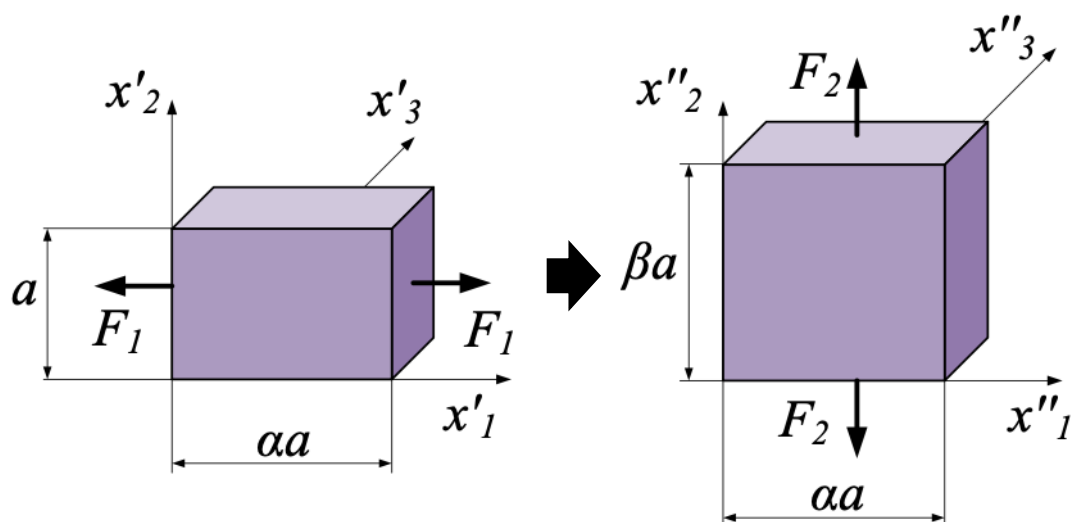
$$x'_1 = \alpha x_1$$

$$x'_2 = x_2$$

$$x'_3 = x_1$$

$$\mathbf{F}_1 = \begin{bmatrix} \alpha & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & y \end{bmatrix}$$

Korak 2 (transformacija iz 2 u 3)



$$V = a^3 = \alpha a \cdot \beta a \cdot za \rightarrow z = \frac{1}{\alpha\beta} = \frac{25}{39}$$

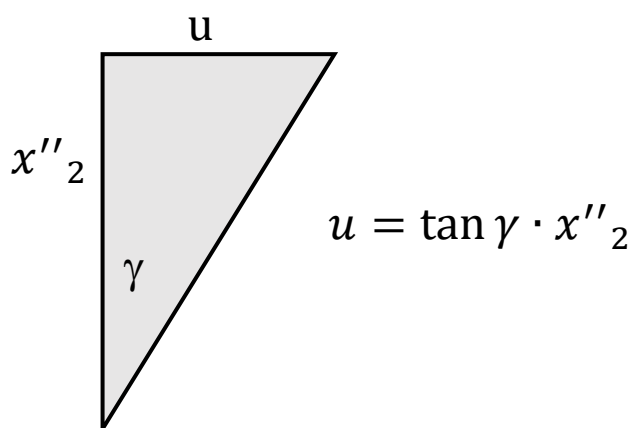
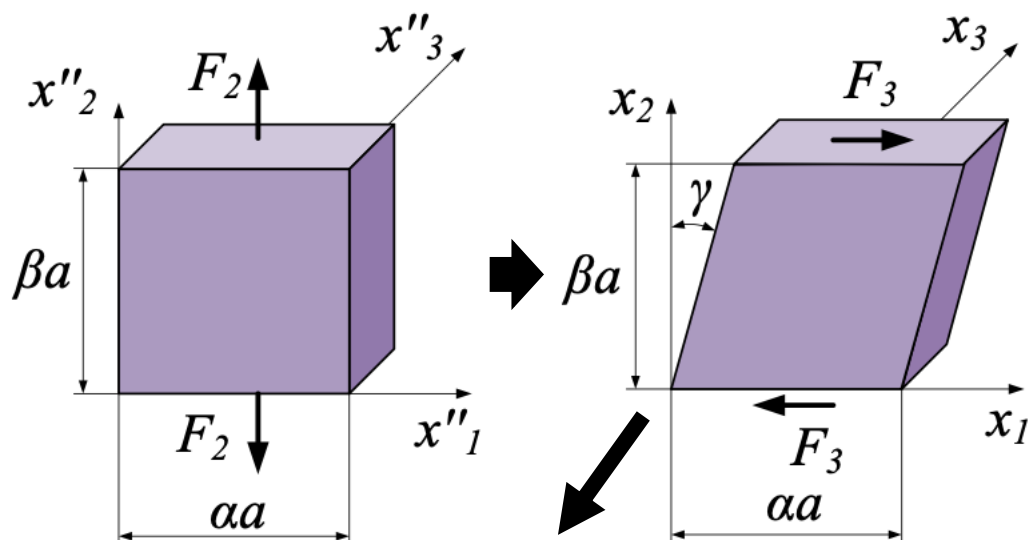
$$x''_1 = x'_1$$

$$x''_2 = \beta x'_2$$

$$x''_3 = zx'_3$$

$$\mathbf{F}_2 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \beta & 0 \\ 0 & 0 & z \end{bmatrix}$$

Korak 3 (transformacija iz 3 u 4)



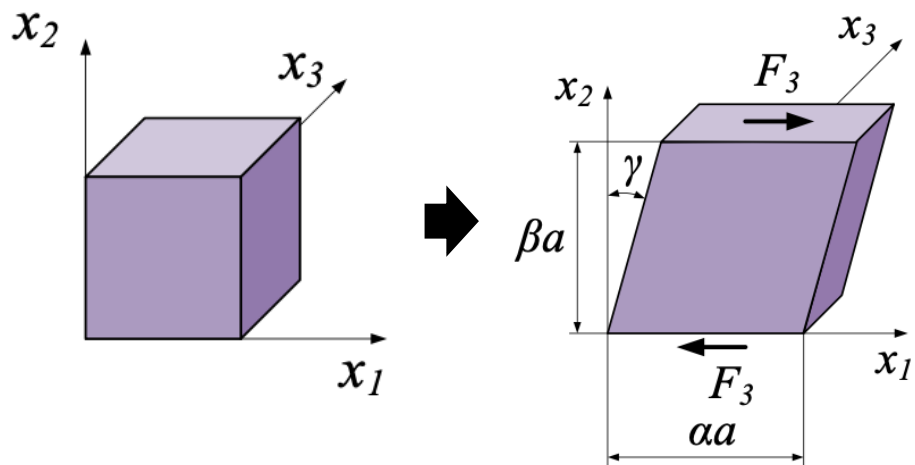
$$x_1 = x''_1 + \tan \gamma \cdot x''_2$$

$$x_2 = x''_2$$

$$x_3 = x''_3$$

$$\mathbf{F}_3 = \begin{bmatrix} 1 & \tan \gamma & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Korak 4 (transformacija iz 1 u 4)



$$\mathbf{F}_4 = \mathbf{F}_3 \mathbf{F}_2 \mathbf{F}_1$$

$$\mathbf{b} = \mathbf{F} \mathbf{F}^T$$

$$\mathbf{C} = \mathbf{F}^T \mathbf{F}$$

$$\mathbf{E} = \frac{1}{2} (\mathbf{C} - \mathbf{I})$$

$$\mathbf{e} = (\mathbf{I} - \mathbf{b}^{-1})$$

Duljina najduže prostorne dijagonale

$$\mathbf{d} = \begin{bmatrix} a\alpha \\ \beta a \\ yza \end{bmatrix}$$

$$\mathbf{D} = \mathbf{F}_4 \mathbf{d}$$

$$D = \sqrt{a^2 \beta^2 + a^2 y^2 z^2 + (a\alpha + a\beta \tan(\gamma))^2}$$