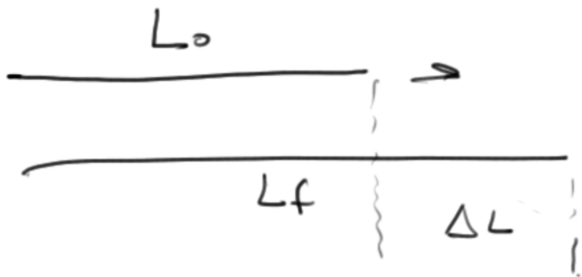


$$\varepsilon_{ENG} = \frac{\Delta L}{L_o} = \frac{L_f - L_o}{L_o} = \lambda - 1 \Rightarrow \lambda = \varepsilon_{ENG} + 1$$

$\frac{L_f}{L_o} = \lambda$

Engineering strain → Lagrangian

$$\varepsilon_{LOG} = \int_{L_o}^{L_f} \frac{dL}{L} = \ln\left(\frac{L_f}{L_o}\right) = \ln(\lambda) = \ln(\varepsilon_{ENG} + 1)$$

Logrithmic strain, natural strain, ~~"True strain"~~

$$\varepsilon_{TR} = \frac{L_f - L_o}{L_f} = 1 - \frac{1}{\lambda} \leftarrow \text{Eulerian strain, } \cancel{\text{"True strain"}}$$

Seth-Hill

$$\varepsilon_{(m)} = \frac{1}{m}\left(\lambda^m - 1\right)$$

$m = 1$ → Eng. strain

$m = -1$ → Eulerian strain

$m = 0$ → Log. strain

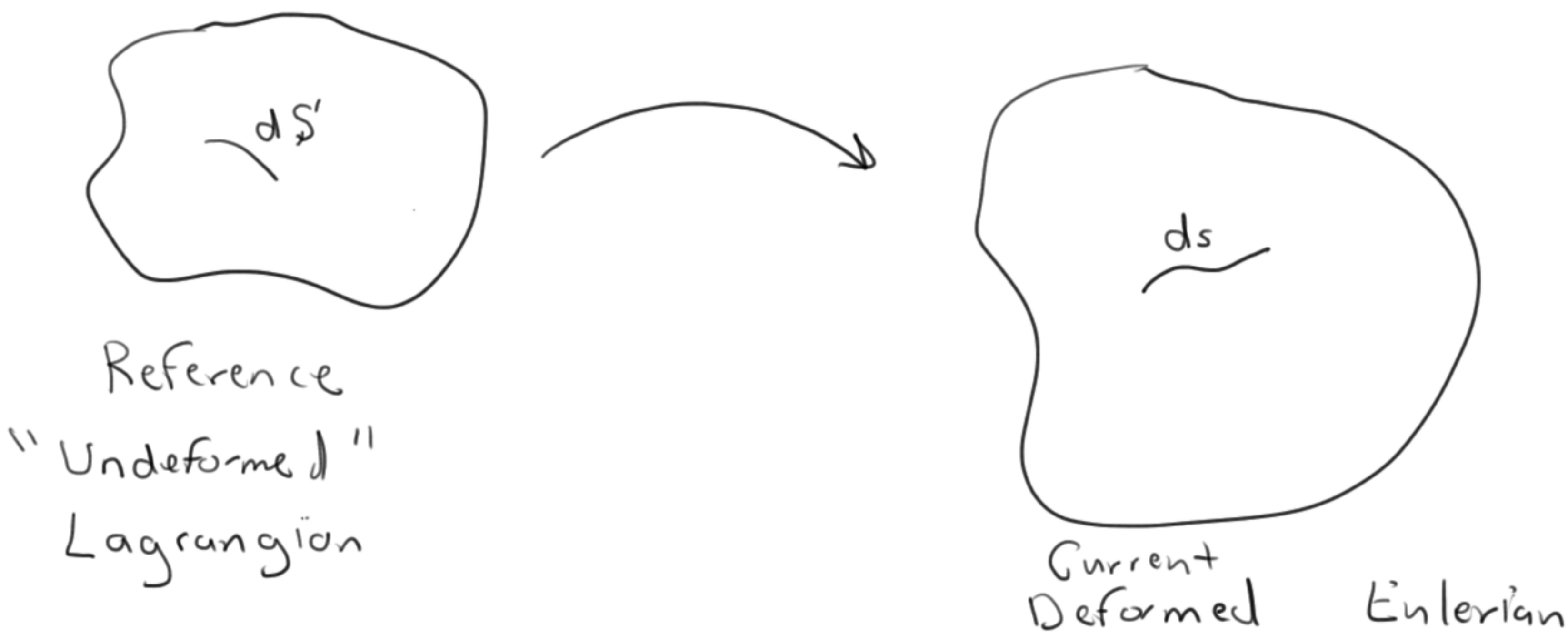
Aside

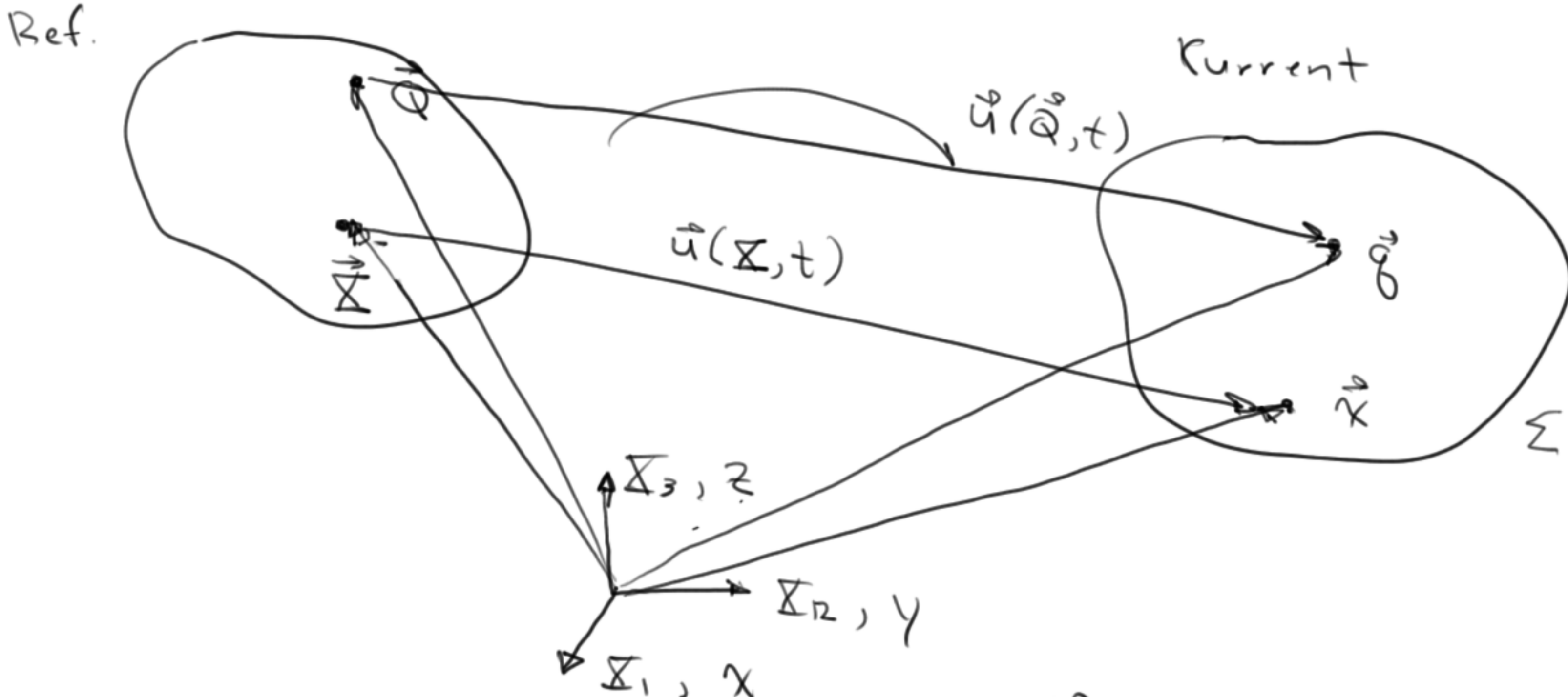
Please "label your strain"

Consider $\lambda = 1.01000$

$$\varepsilon_{ENG} = \lambda - 1 = 0.01000$$

$$\varepsilon_{LOG} = \ln(\lambda) = 0.00990$$





$$\Sigma(a_i b_i) c_i$$

$$a_i b_i c_j$$

$$\vec{X} = X_1 \hat{i} + X_2 \hat{j} + X_3 \hat{k}$$

$$\vec{x} = \vec{X} + \vec{u}(\vec{X},t)$$

$$\vec{q} = \vec{Q} + \vec{u}(\vec{Q},t)$$

$$\vec{X} = X_1 \hat{e}_1 + X_2 \hat{e}_2 + X_3 \hat{e}_3$$

$$\vec{X} = \cancel{\sum_{i=1}^{3}} X_i \hat{e}_i$$

$$\vec{x} = \vec{x}(\vec{X},t)$$

$$\vec{q} = \vec{q}(\vec{Q},t)$$

$$\vec{X} = X_i \hat{e}_i$$