

Föreläsning 8

~ CHR?

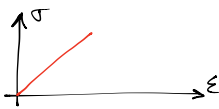
Töjningar (jämför med ∇T)

$$\left. \begin{aligned} \varepsilon_{xx} &= \frac{\partial u_x}{\partial x} & \gamma_{xy} &= \frac{\partial u_x}{\partial y} + \frac{\partial u_y}{\partial x} = \gamma_{yx} \\ \varepsilon_{yy} &= \frac{\partial u_y}{\partial y} & \gamma_{xz} &= \frac{\partial u_x}{\partial z} + \frac{\partial u_z}{\partial x} = \gamma_{zx} \\ \varepsilon_{zz} &= \frac{\partial u_z}{\partial z} & \gamma_{yz} &= \frac{\partial u_y}{\partial z} + \frac{\partial u_z}{\partial y} = \gamma_{zy} \end{aligned} \right\} \boldsymbol{\varepsilon} = \begin{bmatrix} \varepsilon_{xx} \\ \varepsilon_{yy} \\ \varepsilon_{zz} \\ \gamma_{xy} \\ \gamma_{xz} \\ \gamma_{yz} \end{bmatrix}, \quad \tilde{\nabla} = \begin{bmatrix} \delta/\delta x & 0 & 0 \\ 0 & \delta/\delta y & 0 \\ 0 & 0 & \delta/\delta z \\ \delta/\delta y & \delta/\delta x & 0 \\ \delta/\delta z & 0 & \delta/\delta x \\ 0 & \delta/\delta z & \delta/\delta y \end{bmatrix}, \quad \mathbf{U} = \begin{bmatrix} U_x \\ U_y \\ U_z \end{bmatrix}$$

Vi kan nu förenkla de läskiga ekvationerna:

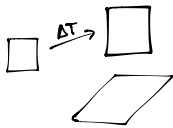
$$\boxed{\begin{cases} \boldsymbol{\varepsilon} = \tilde{\nabla} \mathbf{U} \\ \tilde{\nabla}^T \boldsymbol{\sigma} + \mathbf{b} = \mathbf{0} \end{cases}}$$

Linjär elasticitet



$$\boldsymbol{\varepsilon} = \boldsymbol{\varepsilon}^0 + \boldsymbol{\varepsilon}^e + \boldsymbol{\varepsilon}^p + \boldsymbol{\varepsilon}^{\text{svällning}} + \boldsymbol{\varepsilon}^{\text{krypning}} + \boldsymbol{\varepsilon}^{\Delta T}$$

Termiska töjningar



(Ingen skjuvning)

$$\Rightarrow \boldsymbol{\varepsilon}^{\Delta T} = \alpha \Delta T \begin{bmatrix} 1 \\ \vdots \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

Konstitutiv parameter