

# Correction lec 4/28

Wednesday, May 4, 2016 12:29 PM

## Creep test

B. Voigt  $\sigma = k\varepsilon + \eta \dot{\varepsilon}$ ,  $\sigma = \sigma_0 \cdot u(t)$

$$\mathcal{L}: \frac{\sigma_0}{s} = kX(s) + \eta \cdot s \cdot X(s)$$

$$\rightarrow X(s) = \frac{\sigma_0}{(k + \eta s) \cdot s} = \frac{\textcircled{P}}{s + \frac{k}{\eta}} + \frac{\textcircled{R}}{s}$$

for P & R,  $sP + (s + \frac{k}{\eta})R = \frac{\sigma_0}{\eta}$

$$P + R = 0, \quad \frac{k}{\eta}R = \frac{\sigma_0}{\eta}$$

$$R = \frac{\sigma_0}{k}, \quad P = -\frac{\sigma_0}{k}$$

$$\therefore X(s) = \frac{-\frac{\sigma_0}{k}}{s + \frac{k}{\eta}} + \frac{\frac{\sigma_0}{k}}{s}$$

$$\mathcal{L}^{-1}: \varepsilon = \frac{\sigma_0}{k} \left[ 1 - e^{-\frac{\sigma_0}{\eta} t} \right]$$