Homework #3 **Deadline: March 26, 2019, 13:10.**

1. **Prove** that a response of a generalized Bingham fluid

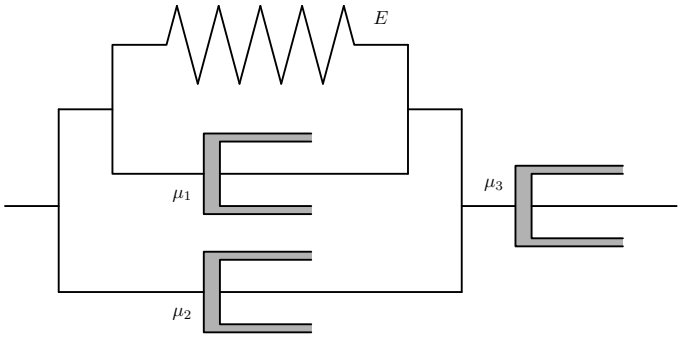
$$|\mathbf{S}| \leq \tau^* \Leftrightarrow \mathbf{D} = \mathbf{O}$$
$$|\mathbf{S}| > \tau^* \Leftrightarrow \mathbf{S} = \tau^* \frac{\mathbf{D}}{|\mathbf{D}|} + 2\mu(|\mathbf{D}|^2)\mathbf{D}$$

   is equivalent to the constitutive relation

$$2\mu(|\mathbf{D}|^2)\mathbf{D} = \frac{(|\mathbf{S}| - \tau^*)^+}{|\mathbf{S}|}\mathbf{S},$$

   where $x^+ := \max\{0, x\}$, $\tau^* > 0$ and $\mu(\cdot) : \mathbb{R}_0^+ \to \mathbb{R}^+$.

2. Consider an element that is depicted in a Figure below:



   Derive the stress-strain relation for this element.