

# Solution d'un problème d'évolution **élasto-plastique** $\{ \underline{\xi}(t), \underline{\sigma}(t) \}, t \in [0, T]$

$$P = \left\{ \begin{array}{l} \underline{\underline{\sigma}} ; \forall \underline{x} \in \Omega, \\ f(\underline{\underline{\sigma}}(\underline{x})) \leq 0 \end{array} \right\}$$

$$S(t) = \left\{ \begin{array}{l} \underline{\underline{\sigma}} \text{ s.a.} \\ \underline{F}^d(t), \underline{T}^d(t) \end{array} \right\}$$

$$C(t) = \left\{ \underline{\underline{\xi}} \text{ c.a. } \underline{\xi}^d(t) \right\}$$

Etat initial:

$$\underline{\underline{\sigma}}(t=0) = \underline{\underline{\sigma}}^0 \in P \cap S(t=0)$$

$$\underline{\underline{\sigma}}(t) \in P \cap S(t)$$

**contraintes**

$$\underline{\underline{\xi}}(t) \in C(t)$$

**déplacements**

$$\begin{aligned} \underline{\underline{d}} &= \frac{1+\nu}{E} \underline{\underline{\dot{\sigma}}} - \frac{\nu}{E} \text{tr}(\underline{\underline{\dot{\sigma}}}) \underline{\underline{1}} + \\ &+ \lambda \frac{\partial f}{\partial \underline{\underline{\sigma}}}(\underline{\underline{\sigma}}), \lambda(\underline{x}) \geq 0 \end{aligned}$$

Règle  
d'écoulement  
plastique

$$\underline{\underline{d}} = \frac{1+\nu}{E} \underline{\underline{\dot{\sigma}}} - \frac{\nu}{E} \text{tr}(\underline{\underline{\dot{\sigma}}}) \underline{\underline{1}} + \lambda \frac{\partial f}{\partial \underline{\underline{\sigma}}}(\underline{\underline{\sigma}}), \lambda(\underline{\underline{x}}) \geq 0$$

