MILIEUX 3D

σ_I , σ_{II} , σ_{III} valeurs principales de $\underline{\underline{\sigma}}$ avec : $\sigma_I \geq \sigma_{II} \geq \sigma_{III}$
d_I , d_{II} , d_{III} valeurs principales de $\underline{\underline{d}}$. $\underline{V}$ discontinuité de la vitesse à travers une surface de normale extérieure $\underline{n}$.

TRESCA

$$F(\underline{\underline{\sigma}}) = \sigma_I - \sigma_{III} - 2C \qquad (2C=\sigma_0)$$

$$\pi(\underline{\underline{d}}) = \begin{cases} +\infty & \text{si } tr(\underline{\underline{d}}) \neq 0 \\ C\,(|d_I| + |d_{II}| + |d_{III}|) & \text{si } tr(\underline{\underline{d}}) = 0 \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} +\infty & \text{si } \underline{V}\cdot\underline{n} \neq 0 \\ C|\underline{V}| & \text{si } \underline{V}\cdot\underline{n} = 0 \end{cases}$$

VON MISES

$$F(\underline{\underline{\sigma}}) = \sqrt{\tfrac{1}{2}\,tr\,\underline{\underline{s}}^2} - k$$

$$\pi(\underline{\underline{d}}) = \begin{cases} +\infty & \text{si } tr(\underline{\underline{d}}) \neq 0 \\ k\sqrt{2\,tr\,\underline{\underline{d}}^2} & \text{si } tr(\underline{\underline{d}}) = 0 \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} +\infty & \text{si } \underline{V}\cdot\underline{n} \neq 0 \\ k|\underline{V}| & \text{si } \underline{V}\cdot\underline{n} = 0 \end{cases}$$

COULOMB

$$F(\underline{\underline{\sigma}}) = \sigma_I - \sigma_{III} + (\sigma_I + \sigma_{III})\sin\varphi - 2C\cos\varphi$$

$$\pi(\underline{\underline{d}}) = \begin{cases} +\infty & \text{si } tr(\underline{\underline{d}}) < (\,d_I| + |d_{II}| + |d_{III}|)\sin\varphi \\ C\,cotg\varphi\,tr(\underline{\underline{d}}) & \text{si } tr(\underline{\underline{d}}) \geq (\,d_I| + |d_{II}| + |d_{III}|)\sin\varphi \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} +\infty & \text{si } \underline{V}\cdot\underline{n} < |\underline{V}|\sin\varphi \\ C\,cotg\varphi\,\underline{V}\cdot\underline{n} & \text{si } \underline{V}\cdot\underline{n} > |\underline{V}|\sin\varphi \end{cases}$$

MILIEUX 2D (déformation plane)

σ_I , σ_{II} valeurs principales de $\underline{\sigma}$.
d_I , d_{II} , valeurs principales de $\underline{d}$. $\underline{V}$ discontinuité de la vitesse à travers une ligne de normale extérieure $\underline{n}$.

TRESCA

$$F(\underline{\sigma}) = |\sigma_I - \sigma_{II}| - 2C$$

$$\pi(\underline{d}) = \begin{cases} +\infty & \text{si } tr(\underline{d}) \neq 0 \\ C\,(|d_I| + |d_{II}|) & \text{si } tr(\underline{d}) = 0 \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} +\infty & \text{si } \underline{V} \cdot \underline{n} \neq 0 \\ C\,|\underline{V}| & \text{si } \underline{V} \cdot \underline{n} = 0 \end{cases}$$

VON MISES

$$F(\underline{\sigma}) = |\sigma_I - \sigma_{II}| - 2k$$

$$\pi(\underline{d}) = \begin{cases} +\infty & \text{si } tr(\underline{d}) \neq 0 \\ k\sqrt{2\left(d_I^2 + d_{II}^2\right)} & \text{si } tr(\underline{d}) = 0 \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} +\infty & \text{si } \underline{V} \cdot \underline{n} \neq 0 \\ k\,|\underline{V}| & \text{si } \underline{V} \cdot \underline{n} = 0 \end{cases}$$

COULOMB

$$F(\underline{\sigma}) = |\sigma_I - \sigma_{II}| + (\sigma_I + \sigma_{II}) \sin\varphi - 2C\cos\varphi$$

$$\pi(\underline{d}) = \begin{cases} +\infty & \text{si } tr(\underline{d}) < (|d_I| + |d_{II}|) \sin\varphi \\ C\,\mathrm{cotg}\varphi\, tr(\underline{d}) & \text{si } tr(\underline{d}) \geq (|d_I| + |d_{II}|) \sin\varphi \end{cases}$$

$$\pi(\underline{n}, \underline{V}) = \begin{cases} -\infty & \text{si } \underline{V} \cdot \underline{n} < |\underline{V}| \sin\varphi \\ C\,\mathrm{cotg}\varphi\, \underline{V} \cdot \underline{n} & \text{si } \underline{V} \cdot \underline{n} \geq |\underline{V}| \sin\varphi \end{cases}$$