

Calcolo di J_2 in funzione di $\underline{\sigma}$

$$J_2 = -I_2(\underline{\sigma}^{DEV}) = -\frac{1}{2} \left[\left(\text{tr} \underline{\sigma}^{DEV} \right)^2 - \text{tr} \underline{\sigma}^{DEV^2} \right] = -\frac{1}{2} \text{tr} \underline{\sigma}^{DEV^2}$$

$$J_2 = \frac{1}{2} \text{tr} \left[(\underline{\sigma} - \sigma_m^* \underline{I})(\underline{\sigma} - \sigma_m^* \underline{I}) \right] = \frac{1}{2} \text{tr} \left[\underline{\sigma}^2 - 2\sigma_m^* \underline{\sigma} + \sigma_m^{*2} \underline{I} \right]$$

($*$: si noti che σ_m è uno scalare)

$$J_2 = \frac{1}{2} \left[\text{tr} \underline{\sigma}^2 - 2\sigma_m \underbrace{\text{tr} \underline{\sigma}}_{3\sigma_m} + \sigma_m^2 3 \right] = \frac{1}{2} \left[\text{tr} \underline{\sigma}^2 - 6\sigma_m^2 + 3\sigma_m^2 \right]$$

$$J_2 = \frac{1}{2} \left[\text{tr} \underline{\sigma}^2 - 3\sigma_m^2 \right] = \frac{1}{2} \left[\text{tr} \underline{\sigma}^2 - \frac{1}{3} \underbrace{(9\sigma_m^2)}_{(\text{tr} \underline{\sigma})^2} \right]$$

$$J_2 = \frac{1}{2} \left[\text{tr} \underline{\sigma}^2 - \frac{1}{3} (\text{tr} \underline{\sigma})^2 \right]$$