

FORMULAE - LECTURE 11

Geomechanical behaviour of unsaturated geomaterials

$$S = \frac{4T \cos \theta}{D}$$

$$S = p_a - p_w$$

$$S_r = \left\{ \frac{1}{1 + [\alpha(p_a - p_w)]^n} \right\}^m$$

$$k = k_s e^{-\alpha(p_a - p_w)}$$

$$\mathbf{q}_i = -\frac{\mathbf{k}_i}{\mu_i} (\nabla p_i + \rho_i \mathbf{g})$$

$$\mathbf{k}_i = K k_{r,i}(S_r)$$

$$k_{rw} = \sqrt{S_r} \cdot \left[1 - \left(1 - S_r^{\frac{1}{m}} \right)^m \right]^2$$

$$k_{rg} = \sqrt{1 - S_r} \cdot \left[1 - S_r^{\frac{1}{m}} \right]^{2m}$$

$$\sigma_{net,ij} = \sigma_{ij} - p_a \delta_{ij}$$

$$\sigma'_{ij} = \sigma_{ij} - \sum_{\beta=1}^n \alpha_{\beta} p_{\beta} \delta_{ij}$$

$$\sigma'_{ij} = (\sigma_{ij} - p_a \delta_{ij}) + \chi(p_a - p_w) \delta_{ij}$$

$$\sigma'_{ij} = \sigma_{net,ij} + S_r s \delta_{ij}$$