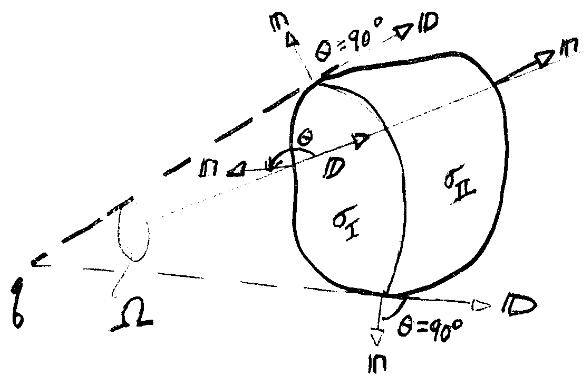
RJP-645



$\mathbb{D}\cdot\mathbb{n} = D\cdot 1\cdot \cos\theta$

$\cos\theta > 0$ for σ_{II}

but $\cos\theta < 0$ for σ_{I}

Follow same arguments as before

$$\oint_{\sigma} \mathbb{D}\cdot\mathbb{n}\,d\sigma = \oint_{\sigma_I} \mathbb{D}\cdot\mathbb{n}\,d\sigma + \oint_{\sigma_{II}} \mathbb{D}\cdot\mathbb{n}\,d\sigma$$

$$\oint_{\sigma} \mathbb{D}\cdot\mathbb{n}\,d\sigma = \frac{Q}{4\pi}\oint_{\sigma_I} \frac{\mathbb{e}_r\cdot\mathbb{n}}{r^2}\,d\sigma + \frac{Q}{4\pi}\oint_{\sigma_{II}} \frac{\mathbb{e}_r\cdot\mathbb{n}}{r^2}\,d\sigma = \frac{Q}{4\pi}\oint_{\sigma}\left[\frac{d\sigma_I\cos\theta}{r^2} + \frac{d\sigma_{II}\cos\theta}{r^2}\right]$$

~ from cos θ

$$= \frac{Q}{4\pi}\oint_{\sigma}\left[\frac{dA_{II}}{r^2} - \frac{dA_I}{r^2}\right] = \frac{Q}{4\pi}\oint_{\sigma}\left(d\Omega_{II} - d\Omega_I\right)$$

but $\int d\Omega_I = \int d\Omega_{II} = \Omega$ Hence

$$\oint_{\sigma} \mathbb{D}\cdot\mathbb{n}\,d\sigma = 0, \text{ but } \mathbb{D} \neq 0$$