E8 202 Class 6

$$E^{\pm} = \frac{1}{4\pi\epsilon_0} \sum_{j=1}^{J} \int_{s'} \sigma_T(r') \frac{r - r'}{|r - r'|^3} \, ds' \pm n \frac{\sigma_T(r)}{2\epsilon_0}$$

$$\epsilon^+ E^+(r) \cdot n = \epsilon^- E^- \cdot n$$

$$\frac{(\epsilon^+ + \epsilon^-)}{2\epsilon_0 (\epsilon^+ - \epsilon^-)} \sigma_T(r) + \frac{1}{4\pi\epsilon_0} \sum_{j=1}^{J} \int_{s'} \sigma_T(r') \frac{(r - r') \cdot n}{|r - r'|^3} \, ds = 0$$

$$\begin{array}{c|cc} & cc & CD \\ \hline cc & & \\ CD & & \end{array} \begin{bmatrix} \sigma_{cc} \\ \sigma_{CD} \end{bmatrix} = \begin{bmatrix} V \\ 0 \end{bmatrix}$$

Dielectric electrostatics.

Electric Field Integral eq^n :- PEC

Boundary cond^n :-

$$n \times E = 0 \quad \text{on PEC}$$

$$E_T = E_s + E_{inc}\big|_{tan} = 0.$$

Equation :-

$$\nabla \times E = -j\omega B \longrightarrow E = -j\omega A - \nabla\phi$$

$$\nabla \times H = j\omega D + J$$

$$\nabla \cdot D = \rho$$

$$\nabla \cdot B = 0 \longrightarrow B = \nabla \times A$$

$$\nabla \cdot A = -j\omega\mu\epsilon\,\phi$$

Lorentz Gauge

$$\longrightarrow (\nabla^2 + k^2) A = -\mu J$$

$$\longrightarrow (\nabla^2 + k^2)\phi = -\frac{\rho}{\epsilon}$$

Greens' fn :-

$$G_\phi(r, r') = \frac{1}{4\pi\epsilon_0}\frac{e^{-jk|r-r'|}}{|r-r'|}$$

$$G_A(r, r') = \frac{\mu}{4\pi}\frac{e^{-jk|r-r'|}}{|r-r'|}$$