

## 1 Fondamentali

$$f_{oo}$$

## 2 Potenziale ed Energia

$$U = \frac{1}{2} \iiint \rho(\mathbf{x}) V(\mathbf{x}) d\nu$$
$$U = \frac{1}{8\pi} \iiint |E|^2 d\nu$$

## 3 Funzione di Green

Generica:

$$V(\mathbf{x}) = \iiint \rho(\mathbf{x}') G(\mathbf{x}, \mathbf{x}') d\nu(\mathbf{x}') + \frac{1}{4\pi} \oint \left( G(\mathbf{x}, \mathbf{x}') \frac{\partial V(\mathbf{x}')}{\partial n'} - V(\mathbf{x}') \frac{\partial G(\mathbf{x}, \mathbf{x}')}{\partial n'} \right) dS(\mathbf{x}')$$

Condizioni Dirichlet:

$$G_D(\mathbf{x}, \mathbf{x}') = 0 \quad \text{per } \mathbf{x}' \in S$$
$$V(\mathbf{x}) = \iiint \rho(\mathbf{x}') G_D(\mathbf{x}, \mathbf{x}') d\nu(\mathbf{x}') - \frac{1}{4\pi} \oint V(\mathbf{x}') \frac{\partial G_D(\mathbf{x}, \mathbf{x}')}{\partial n'} dS(\mathbf{x}')$$

Condizioni Neumann:

$$\frac{\partial G_D(\mathbf{x}, \mathbf{x}')}{\partial n'} = -\frac{4\pi}{S} \quad \text{per } \mathbf{x}' \in S$$
$$V(\mathbf{x}) = \langle V \rangle + \iiint \rho(\mathbf{x}') G(\mathbf{x}, \mathbf{x}') d\nu(\mathbf{x}') + \frac{1}{4\pi} \oint G(\mathbf{x}, \mathbf{x}') \frac{\partial V(\mathbf{x}')}{\partial n'} dS(\mathbf{x}')$$

Piano:

Sfera:

$$G(\mathbf{x}, \mathbf{x}') = \frac{1}{|\mathbf{x} - \mathbf{x}'|} - \frac{a}{x' |\mathbf{x} - \frac{a^2}{x'^2} \mathbf{x}'|}$$

$$\left. \frac{\partial G}{\partial n'} \right|_{x'=a} = - \frac{x^2 - a^2}{a(x^2 + a^2 - 2ax \cos \gamma)^{3/2}}$$

## 4 Armoniche sferiche