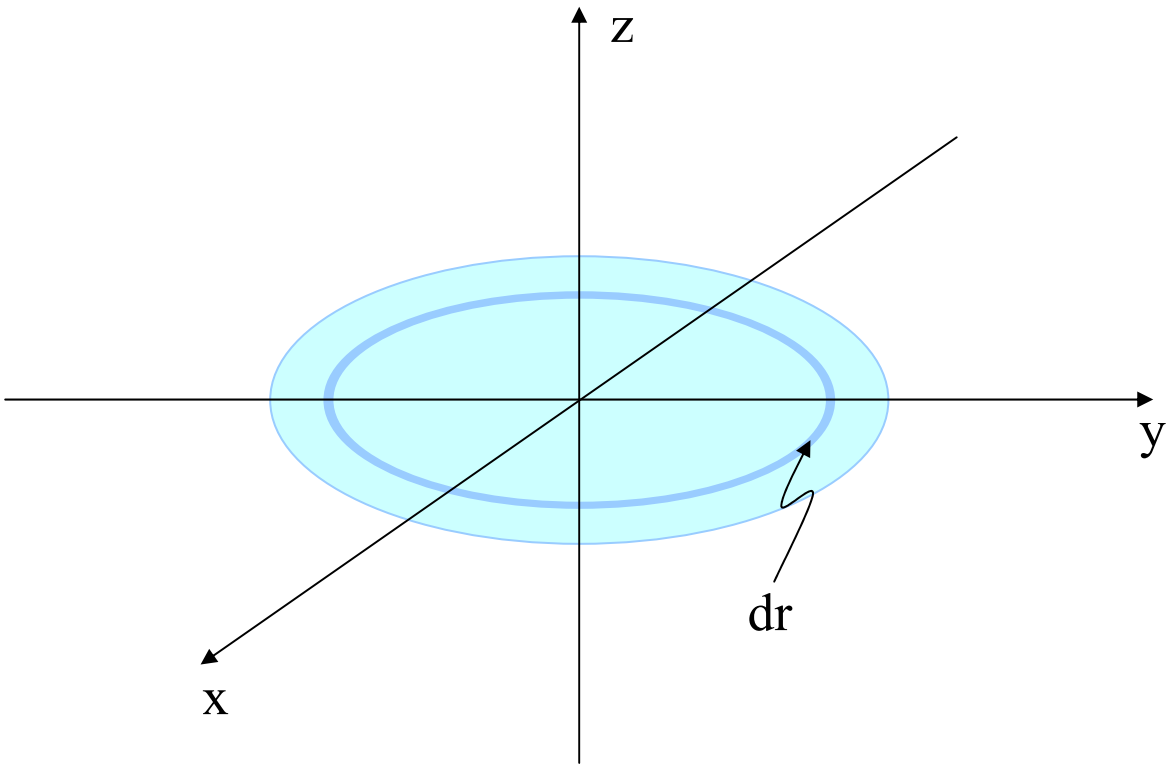
Esempio

Elettrostatico 2D ½

Disco a spessore nullo
in dominio illimitato omogeneo



$R = 1m \quad V = 1V \quad \varepsilon = \varepsilon_0$

Calcolo della capacità

Formula analitica

$C = 8\varepsilon R$

$$\frac{C}{\varepsilon R} = 8$$

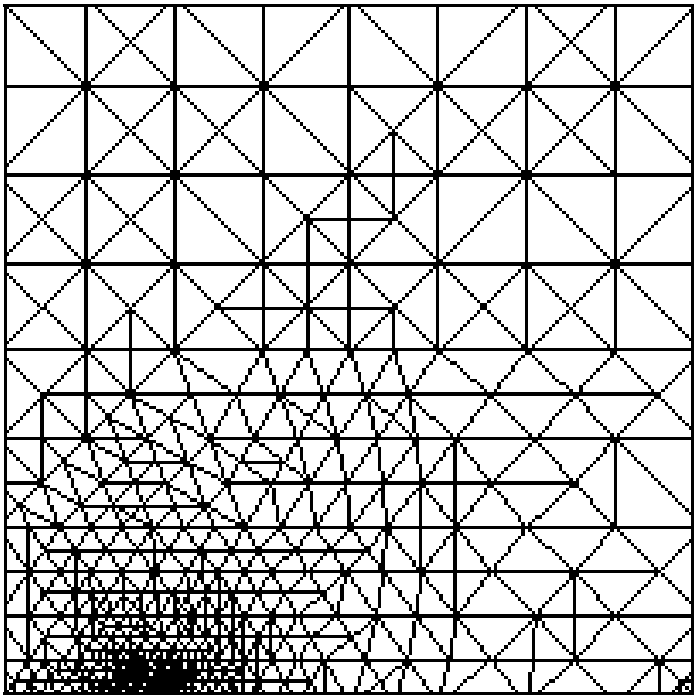
Formula per il calcolo della capacità a partire dalla soluzione numerica FEM

$$C = \frac{Q}{V} \qquad \frac{C}{\varepsilon R} = \frac{Q}{\varepsilon R V}$$

$$Q = \oint_S \vec{D} \cdot \hat{n} dS = \varepsilon \oint_S \frac{\partial V}{\partial n} dS = \varepsilon \int_0^R \frac{\partial V}{\partial n} 2\pi r dr$$

$$\frac{Q}{\varepsilon} = 2\pi \int_0^R \frac{\partial V}{\partial n} r\, dr \qquad \frac{C}{\varepsilon R} = \frac{2\pi \int_0^R \frac{\partial V}{\partial n} r\, dr}{V R}$$

Prima mesh adattativa



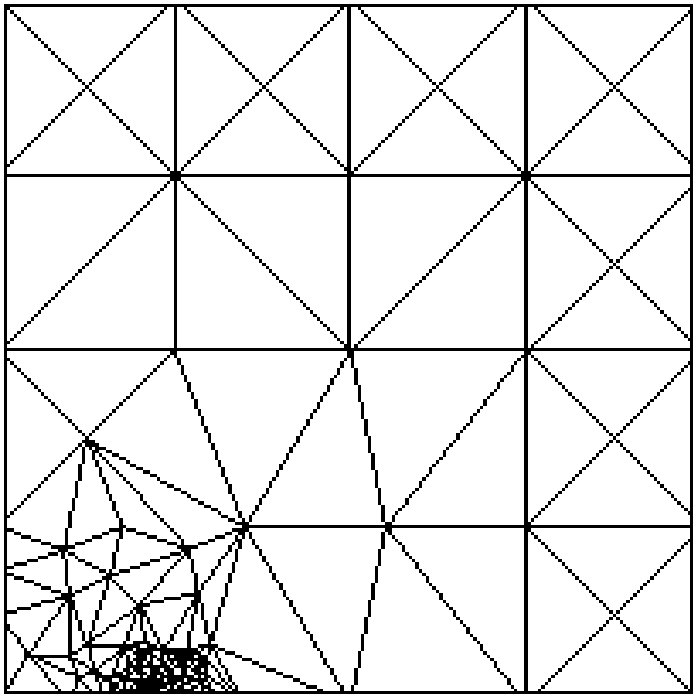
793 elementi

energy error (%) = 8.9928

C=7.3523394

errore (%) = -8.1

Mesh manuale



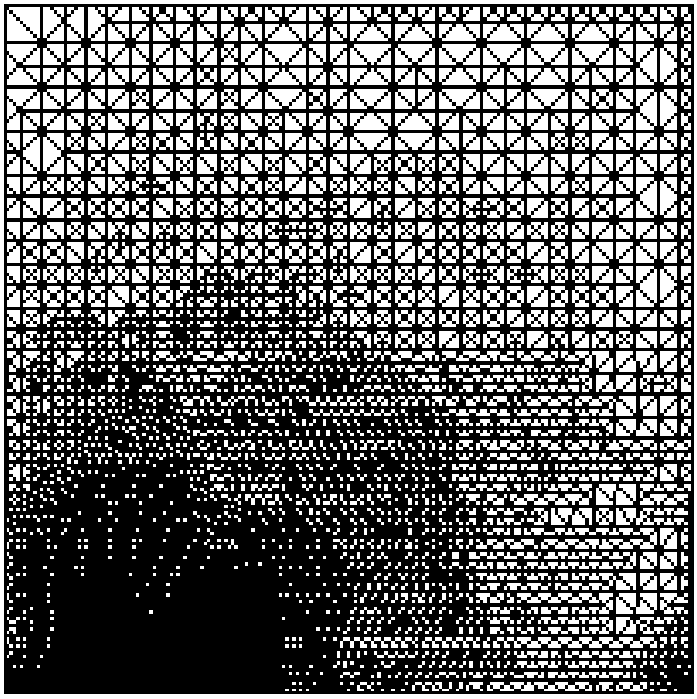
522 elementi

energy error (%) = 10.1174

C=7.34009669

errore (%) = -8.2

Seconda mesh adattativa



17402 elementi

energy error (%) = 0.9072

C=8.12853353

errore (%) = 1.6