ESERCIZIO

Calcolare σ_z, noti σ_x e σ_y ,dalla funzione:

$$z = \frac{3}{2} \cdot \frac{\sqrt{x}}{y^3}$$

Ricordando che:

$$\frac{\sigma_{\sqrt{x}}}{\sqrt{x}} = \frac{1}{2} \cdot \frac{\sigma_x}{x} \qquad e \qquad \frac{\sigma_{y^3}}{y^3} = 3 \cdot \frac{\sigma_y}{y}$$

$$\left(\frac{\sigma_z}{z}\right)^2 = \left(\frac{1}{2} \cdot \frac{\sigma_x}{x}\right)^2 + \left(3 \cdot \frac{\sigma_y}{y}\right)^2$$

$${\sigma_z}^2 = \frac{9x}{4y^6}\left[\left(\frac{1}{4} \cdot \frac{{\sigma_x}^2}{x^2}\right) + \left(9\frac{{\sigma_y}^2}{y^2}\right)\right]$$

$${\sigma_z}^2 = \frac{9}{16y^6x}{\sigma_x}^2 + \frac{81x}{4y^8}{\sigma_y}^2$$

Considerando le derivate parziali

$$\frac{\theta z}{\theta x} = \frac{3}{2y^3} \cdot \frac{1}{2\sqrt{x}} \qquad \frac{\theta z}{\theta y} = \frac{3}{2}\sqrt{x} \cdot \frac{-3}{y^4}$$

$${\sigma_z}^2 = \left(\frac{\theta z}{\theta x}\sigma_x\right)^2 + \left(\frac{\theta z}{\theta y}\sigma_y\right)^2 = \frac{9}{16y^6x}{\sigma_x}^2 + \frac{81x}{4y^8}{\sigma_y}^2$$