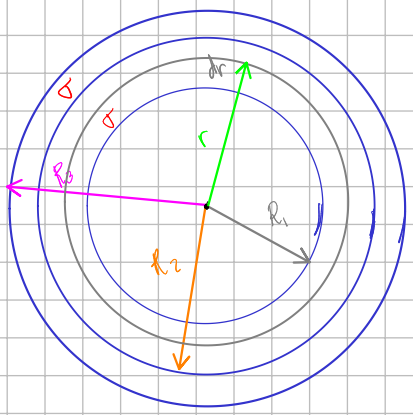
Problema 3. (10 puntos) Encuentre la resistencia entre tres superficies esféricas concéntrico de radio R_1, R_2 y R_3 $(R_1 < R_2 < R_3)$ si el espacio entre las superficies está relleno con un material homogéneo e isótropo con conductividad σ.



$$R = \frac{L}{\sigma A}$$

$$dR = \frac{1}{\sigma} \cdot \frac{dr}{4\pi r^2}$$

$$dR = \frac{1}{\sigma 4\pi} \cdot \frac{dr}{r^2}$$

$$R = \frac{1}{\sigma 4\pi} \int_a^b \frac{dr}{r^2}$$

a y b radios

$$R = \frac{1}{\sigma 4\pi} \cdot \left(-\frac{1}{r}\right)\Big|_a^b$$

$$R = \frac{1}{\sigma 4\pi} \left(\frac{1}{r}\right)\Big|_b^a \Rightarrow R = \frac{1}{\sigma 4\pi}\left(\frac{1}{a} - \frac{1}{b}\right)$$

Formula General

$$R_{Total} = R_{12} + R_{23}$$

$$R_T = \frac{1}{\sigma 4\pi}\left(\frac{1}{R_1} - \frac{1}{R_2}\right) + \frac{1}{\sigma 4\pi}\left(\frac{1}{R_2} - \frac{1}{R_3}\right)$$

$$R_T = \frac{1}{\sigma 4\pi} \cdot \left(\frac{1}{R_1} - \frac{1}{R_2} + \frac{1}{R_2} - \frac{1}{R_3}\right)$$

$$\boxed{R_T = \frac{1}{\sigma 4\pi}\left(\frac{1}{R_1} - \frac{1}{R_3}\right)\ [\Omega]}$$ R/

$$R_{12} = \frac{1}{\sigma 4\pi}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

$$R_{23} = \frac{1}{\sigma 4\pi}\left(\frac{1}{R_2} - \frac{1}{R_3}\right)$$