lab 4

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October 7, 2024

$$dR/dL = \left(2.190 \times 10^5 \pm 1.4 \times 10^3\right) \frac{\mu\Omega}{\text{cm}} = \frac{112\,\mu\Omega \cdot \text{cm}}{A}$$

$$A = \frac{112\,\mu\Omega \cdot \text{cm}}{\left(2.190 \times 10^5 \pm 1.4 \times 10^3\right)\ \frac{\mu\Omega}{\text{cm}}} = \left(5.115 \times 10^{-4} \pm 3.3 \times 10^{-6}\right)\ \text{cm}^2$$

$$D = 2r = 2\sqrt{\frac{A}{\pi}} = 2\sqrt{\frac{\left(5.115 \times 10^{-4} \pm 3.3 \times 10^{-6}\right)\ \text{cm}^2}{3.1415\ldots}} = 0.025521 \pm 0.000083\,\text{cm}$$

$$\rho = \frac{RA}{L} = \frac{17.8\,\Omega * \left(\pi\left(\frac{0.00064\,\text{m}}{2}\right)^2\right)}{500 \times \pi \times 0.2131\,\text{m}} = 1.71 \times 10^{-8}\,\Omega \cdot \text{m}$$

$$\begin{aligned}
\lim_{R_0 \to 0} R(T) &= \lim_{R_0 \to 0} \left(R_0 + \alpha(T - T_0)\right) \\
\lim_{R_0 \to 0} R(T) &= \alpha T \\
\frac{R(T)}{\alpha} &= T
\end{aligned}$$

$$\begin{aligned}
P(T) &= \beta T^4 \\
&= \beta \left(\frac{R(T)}{\alpha}\right)^4 \\
&= kR^4
\end{aligned}$$