En el análisis de algunos circuitos eléctricos se utiliza la fórmula $I = \frac{V}{\sqrt{R^2+L^2w^2}}$, donde I es la corriente, V la tensión o voltaje, R la resistencia, L la inductancia y w una constante positiva. Calcule e Interprete $\frac{\partial I}{\partial R}$ y $\frac{\partial I}{\partial L}$

$$I = \frac{V}{\sqrt{R^2+L^2w^2}}$$

$$U = R^2+L^2w^2 \qquad \sqrt{U} = (U)^{1/2} \quad \wedge \quad \frac{d}{dR}\sqrt{U} = \frac{1}{2}U^{-1/2}\cdot\frac{dU}{dR}$$

$$U \quad R:\frac{dU}{dR} = 2R$$

$$\frac{d}{dR}\sqrt{R^2+L^2w^2} = \frac{1}{2}(R^2+L^2w^2)^{-1/2}\cdot 2R = \frac{R}{\sqrt{R^2+L^2w^2}}$$

$$\frac{\partial I}{\partial R} = \frac{0\cdot\sqrt{R^2+L^2w^2} - V\cdot\frac{R}{\sqrt{R^2+L^2w^2}}}{R^2+L^2w^2} = -\frac{VR}{(R^2+L^2w^2)^{3/2}}$$

$$\frac{\partial I}{\partial R} \qquad \frac{\partial I}{\partial R} = \frac{VR}{(R^2L^2w^2)^{3/2}}$$

$$\frac{\partial I}{\partial L} \qquad L:\frac{dU}{dL} = 2Lw^2$$

$$\frac{d}{dL}\sqrt{R^2+L^2w^2} = \frac{1}{2}(R^2+L^2w^2)^{-1/2}\cdot 2Lw^2 = \frac{Lw^2}{\sqrt{R^2+L^2w^2}}$$

$$\frac{\partial I}{\partial L} = \frac{0\cdot\sqrt{R^2+L^2w^2} - V\cdot\frac{Lw^2}{\sqrt{R^2+L^2w^2}}}{R^2+L^2w^2} = -\frac{VLw^2}{(R^2+L^2w^2)^{3/2}}$$

$$\boxed{\frac{\partial I}{\partial L} = -\frac{VLw^2}{(R^2+L^2w^2)^{3/2}}}$$