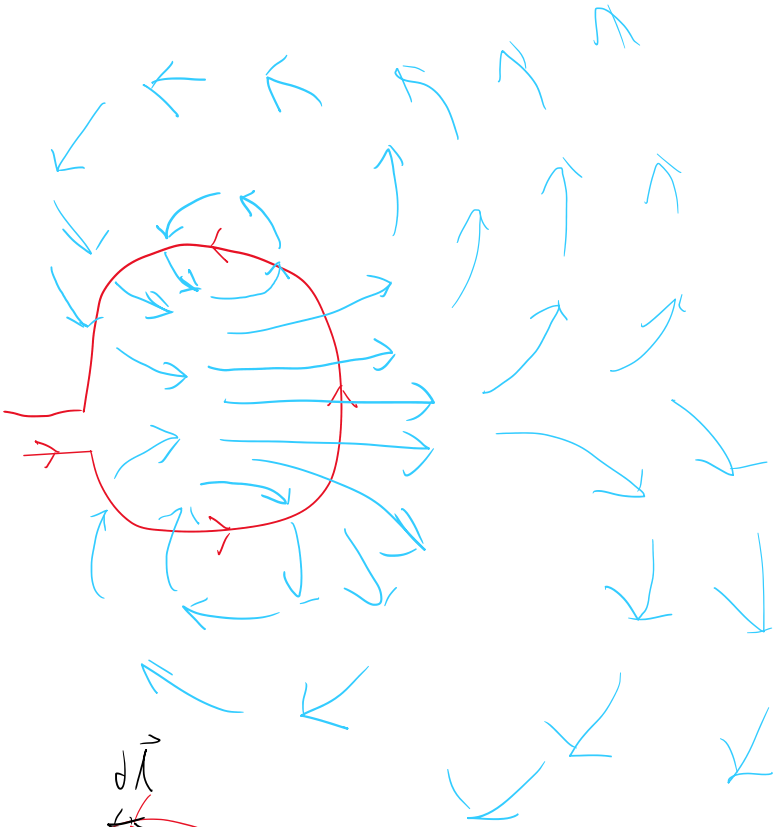
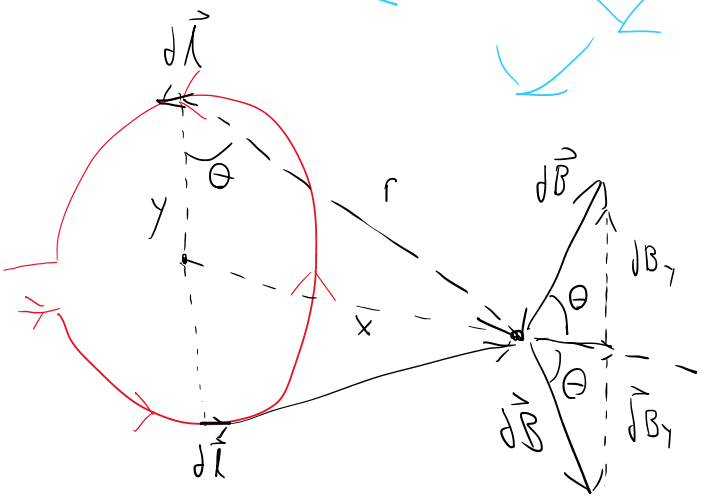
Magnetic field due to current carrying loop



Very far the current carrying loop the magnetic field resembles that from a magnetic dipole.



$$\sum dB = 2\,dB_x$$

$$dB = 2\,dB\cos\theta$$

$$\int dB = 2\left(\frac{\mu_0 I}{4\pi}\int_{loop}\frac{\cos\theta}{x^2+y^2}\,dl\right)$$

$$\cos\theta = \frac{y}{\sqrt{x^2+y^2}}$$

$$\int dB = \frac{\mu_0 I}{2\pi}\int_{loop}\frac{y\,dl}{(x^2+y^2)^{3/2}}$$

$$\int dB = \frac{\mu_0 I}{2\pi} \int_{loop} \frac{}{(x^2 + y^2)^{3/2}}$$

$$B = \frac{\mu_0 I}{2\pi} \frac{y}{(x^2+y^2)^{3/2}} (2\pi y)$$

$$B = \frac{\mu_0 I \; y^2}{(x^2 + y^2)^{3/2}}$$

$$\lim_{x \to \infty} B = 0$$