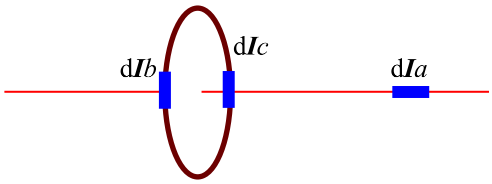
Message 1

For the force on the straight conductor, the force is from the coil, then the d$\boldsymbol{I}a$, d$\boldsymbol{I}b$, d$\boldsymbol{I}c$ will change places. My magnetic force law is:

$$\boldsymbol{F}_{Iba} = \frac{1}{4\pi\varepsilon_0 c^2 |\boldsymbol{r}|^3}\left(d\boldsymbol{I}_a \times (d\boldsymbol{I}_b \times \boldsymbol{r}) + d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b)\right) \quad (1)$$



On d$\boldsymbol{I}a$ the term $d\boldsymbol{I}_a \times (d\boldsymbol{I}_b \times \boldsymbol{r})$ is zero. Now d$\boldsymbol{I}b$ and d$\boldsymbol{I}c$ are on the coil. The term $d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b)$ is zero because **r** and d$\boldsymbol{I}b$ are perpendicular, $\boldsymbol{r}\cdot d\boldsymbol{I}_b = \boldsymbol{0}$. So, the force from the coil is zero.

However, if you put the straight conductor out of the axis line, **r** and d$\boldsymbol{I}b$ are not perpendicular, $\boldsymbol{r}\cdot d\boldsymbol{I}_b \neq \boldsymbol{0}$. But d$\boldsymbol{I}b$ will be on the opposite side, $\boldsymbol{r}\cdot d\boldsymbol{I}_c \neq \boldsymbol{0}$**.** Maybe the sum is not zero, but I haven't computed the sum below:

$$d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b) + d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_c) \neq \boldsymbol{0}$$

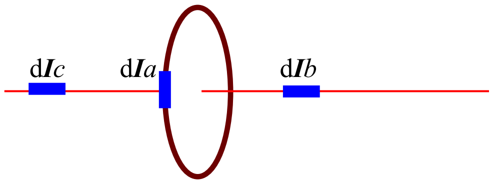
and the straight conductor may move. But this motion may be explained by Lorentz force with is the term $d\boldsymbol{I}_a \times (d\boldsymbol{I}_b \times \boldsymbol{r})$.

Kuan

Message 1
Hello Wolfgang,

I see what your apparatus is. my magnetic force law does not predict any force on your coil. My magnetic force law is:

$$\boldsymbol{F}_{Iba} = \frac{1}{4\pi\varepsilon_0 c^2 |\boldsymbol{r}|^3}\left(d\boldsymbol{I}_a \times (d\boldsymbol{I}_b \times \boldsymbol{r}) + d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b)\right) \quad (2)$$

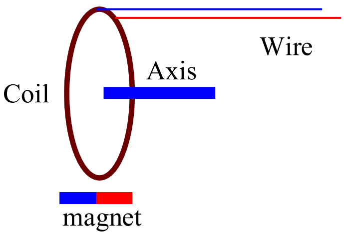


On d***I**a* the term $d\boldsymbol{I}_a \times (d\boldsymbol{I}_b \times \boldsymbol{r})$ is zero, the term $d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b)$ is not zero, but the sum of the forces from d***I**b* and d***I**c* cancel out and equals zero as shown below:

$$d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_b) + d\boldsymbol{I}_a(\boldsymbol{r}\cdot d\boldsymbol{I}_c) = \boldsymbol{0}$$

So, my magnetic force law predicts that the force on your coil is zero and will not move.

However, if you want to see a force that is not Lorentz force but exists against James Clerk Maxwell, then do this:



The coil is round and Lorentz force is perpendicular to the coil, so the coil should not rotate around its axis which is fixed. This is my experiment « Circular motor driven by tangential magnetic force », the video of this experiment is: https://www.youtube.com/watch?v=JkGUaJqa6nU&list=UUuJXMstqPh8VY4UYqDgwcvQ
and explanation
https://www.academia.edu/6227926/Circular_motor_driven_by_tangential_magnetic_force

Kuan