How is calculation of the Inductors?

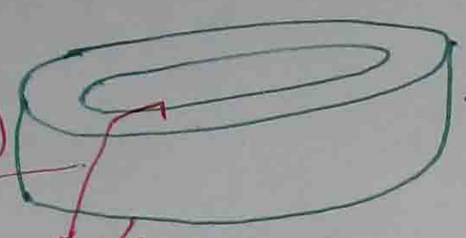
For example,: we need an $100\mu_H$ Inductor

($I_{Inductor\ max} = 5A$)

we want a good core for calculating.

For example, we have a core, that is similar than below

Figure:



in First step: we wind one turn of wire, on this core

and find its Inductance with (LCR) meter.

For example, it's inductance per 1 turn, is

$3\mu H$. we named it's Inductance (L_1).

and this one turn (N_1)

we follow this formula:

$$\frac{N_1}{N_2} = \frac{I_2}{I_1} = \frac{V_1}{V_2} = \sqrt{\frac{R_1}{R_2}} = \sqrt{\frac{L_1}{L_2}} = \sqrt{\frac{C_1}{C_2}} = \sqrt{\frac{X_{C2}}{X_{C1}}} = \sqrt{\frac{X_{L1}}{X_{L2}}} = \frac{\mathcal{E}_1}{\mathcal{E}_2}$$

we use this portion of formula:

$$\left(\frac{N_1}{N_2}\right)^2 = \frac{L_1}{L_2} \Rightarrow$$

$N_1 = 1$ turn

$L_1 = 3\mu H$

$L_2 = 100\mu H$ → the Inductance that we need.

$$\Rightarrow \left(\frac{1}{N_2}\right)^2 = \frac{3\times10^{-6}}{100\times10^{-6}} \Rightarrow N_2 \simeq 5.7 \text{ turn}$$

$\simeq$ 6 turn.