Exo 3:

1- Courant de démarrage:

$U = E + R_a I_a$

Au démarrage $N = 0 \Rightarrow E = 0$.

$U = R_a I_d \Rightarrow I_d = \frac{U}{R_a} = \frac{375}{4} = 93{,}75\,A$.

$I_{max} = 2{,}5 \cdot I_n = 2{,}5 \times 3 \times 7{,}5\,A$.

2- Résistance Totale:

$I_{max} = 7{,}5\,A$.

$U = (R_a + R_d) I_{max} \Rightarrow R_d = \frac{U - R_a I_{max}}{I_{max}} = 46\,\Omega$.

3- $C_d = 1{,}5\,C_n$.

$I_{min} = 1{,}5\,I_n = 4{,}5\,A$.

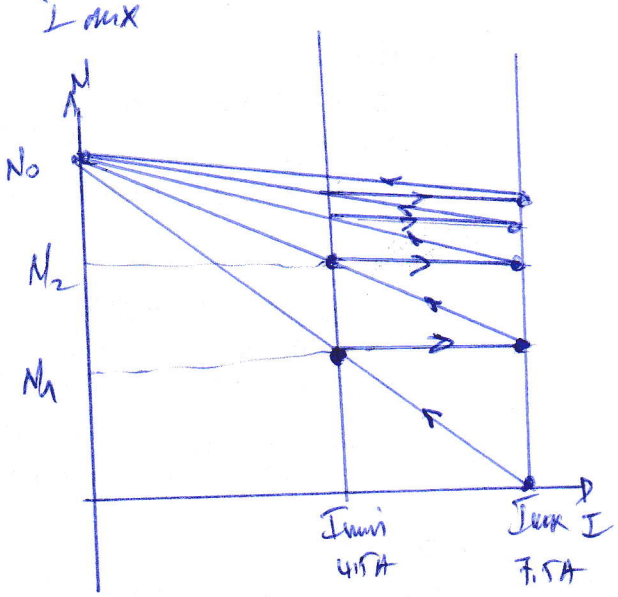
$E = \frac{P}{a} m N \phi = K N$.

$K = \frac{P}{a} m \phi = 24\,UI$ (flux Constant)

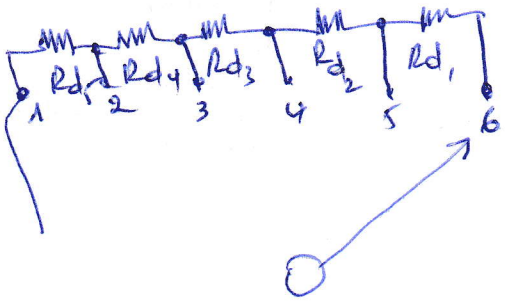
$U = (R_a + R_d) I_{min} + E_1$

$E_1 = K N_1 \Rightarrow N_1 = \frac{U - (R_a + R_d) I_{min}}{K}$

$N_1 = 6{,}25\,tr/s = 375\,Tr/min$.



$\begin{cases} I_{max}(R_a + R_d) = U \rightarrow R_d = 46\,\Omega \\ I_{min}(R_a + R_d) + K N_1 = U \Rightarrow N_1 = 6{,}25\,tr/s \end{cases}$



$\begin{cases} I_{max}(R_a + R_d - R_{d_2}) + K N_1 = U \Rightarrow R_{d_1} = 20\,\Omega \\ I_{min}(R_a + R_d - R_{d_1}) + K N_2 = U \rightarrow N_2 = 10\,tr/min \end{cases}$

6 plots $\rightarrow$ 5 résistance

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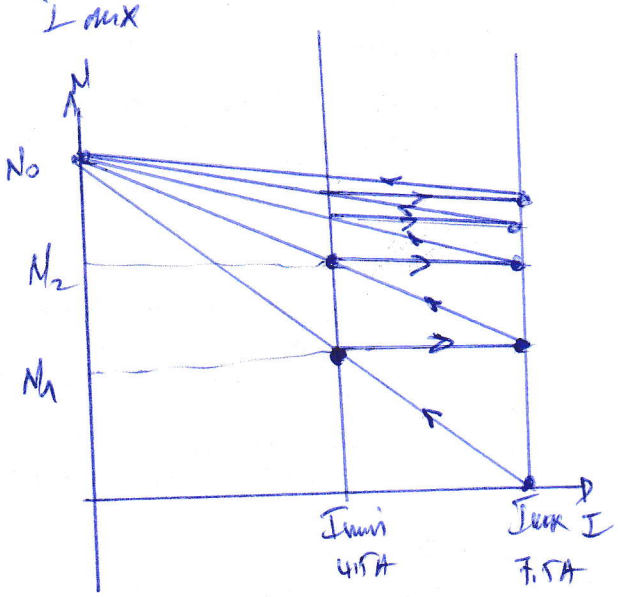

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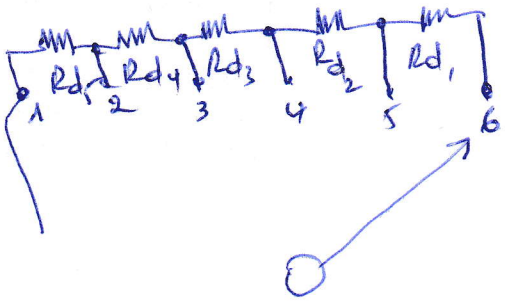

$\begin{cases} I_{max}(R_a + R_d - R_{d_2}) + K N_1 = U \Rightarrow R_{d_1} = 20\,\Omega \\ I_{min}(R_a + R_d - R_{d_1}) + K N_2 = U \Rightarrow N_2 = 10\,tr/min \end{cases}$

6 plots $\rightarrow$ 5 résistance

$$\begin{cases} E_{max}(R_a + R_d - R_{d_1} - R_{d_2}) + kN_2 = U \Rightarrow R_{d_2} = 12\,\Omega \\ E_{min}(R_a + R_d - R_{d_1} - R_{d_2}) + kN_3 = U \Rightarrow N_3 = 12{,}25\ tr/s \end{cases}$$

$$\begin{cases} E_{max}(R_a + R_d - R_{d_1} - R_{d_2} - R_{d_3}) + kN_3 = U \Rightarrow R_{d_3} = 7{,}2\,\Omega. \\ E_{min}(\quad\quad '' \quad\quad) + kN_4 = U \Rightarrow N_4 = 13{,}65\ tr/s. \end{cases}$$

$$\begin{cases} \Rightarrow R_{d_4} = 4{,}48\,\Omega \\ \Rightarrow N_5 = 14{,}44. \end{cases}$$

$$R_{d_5} = R_d - \sum_{i=1}^{4} R_{d_i} = 2{,}32\,\Omega.$$