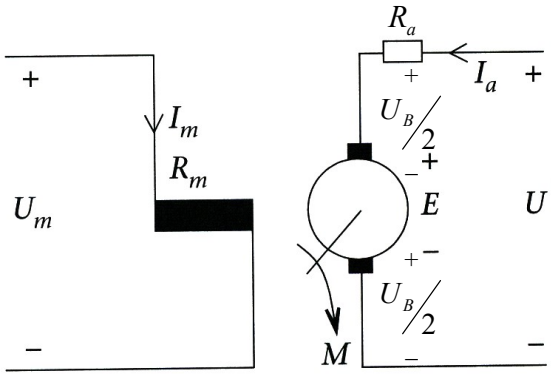
3.21 Seperatmagnetiserad motor



FALL I: $U = 190\ V$ $n_I = 820\ RPM$ $J_{aI} = 25A$

$R_a = 0,70\ \Omega$ $U_B = 2,0\ V$ $M_I = 46\ Nm$

$J_m = 0,80\ A$ $U_m = 220V$

FALL II: $n_{II} = ?$ $M_{II} = 23\ Nm$

FALL III: $n_{III} = ?$ $M_{III} = 0$

a)

FALL I: $\eta = \frac{P_2}{P_1}$ ... (1)

$P_2 = M_I \cdot \omega_I = M_I \cdot \frac{2\pi n_I}{60} \Rightarrow P_2 = 3950\ W$

$P_1 = U \cdot J_{aI} + U_m \cdot J_m \Rightarrow P_1 = 4926\ W$

INS I (1) $\rightarrow$ $\boxed{\eta = 0,802}$

b)

$+U - U_B - R_a \cdot J_{aI} - E_I = 0$ ... (2)

$+U - U_B - R_a \cdot J_{aII} - E_{II} = 0$ ... (3)

$M = k_2 \cdot \Phi \cdot J_a$, $\Phi = KONST \rightarrow J_{aII} = 12,5\ A$

$E = k_1 \cdot \Phi \cdot n$ (J_a SJUNKER TILL HÄLFTEN DÅ M HALVERAS.)

FALL I $\Rightarrow$ $+190 - 2,0 - 0,70 \cdot 25 - k_1 \Phi \cdot 820 = 0$ ... (2)

FALL II $\Rightarrow$ $+190 - 2,0 - 0,70 \cdot 12,5 - k_1 \Phi \cdot n_{II} = 0$ ... (3)

(2) $\Rightarrow k_1 \Phi = 0,2079$ INS I (3) $\Rightarrow$

$\boxed{n_{II} = 862\ RPM}$

c)

FALL III: $+U - U_B - R_a \cdot J_{a\,III} - k_1\Phi \cdot n_{III} = 0$

$J_{a\,III} = 0$ DÅ $M_{III} = 0 \rightarrow$

$+190 - 2{,}0 - 0{,}70 \cdot 0 - 0{,}2079 \cdot n_{III} = 0$

$\Rightarrow \boxed{n_{III} = 904 \text{ RPM}}$

EXTRAFRÅGA:

VID VILKET BELASTNINGSMOMENT STANNAR MOTORN. (FALL IV)
(OM DEN INTE BRUNNIT UPP INNAN)

$U - U_B - R_a J_a - E = 0$

$E \uparrow k_1\Phi n$

$n_{IV} = 0 \Rightarrow 190 - 2 - 0{,}70 \cdot J_{a\,IV} - 0 = 0$

$J_{a\,IV} = 268{,}6\ A$

$$\frac{M_I}{M_{IV}} = \frac{\cancel{k_2\Phi}\, J_{aI}}{\cancel{k_2\Phi}\, J_{aIV}}$$

$$\frac{46}{M_{IV}} = \frac{25}{268{,}6} \rightarrow M_{IV} \approx 494\ Nm$$