Figure labels: Reat 2, Reat 1, $T_d$, $T_L$, $\omega_{rotor}$, $V = I\, R_{ext}\, r_{rotor}$ / rotor

$$500 \, hp \Rightarrow 500 \times 746 W = 373000 W$$

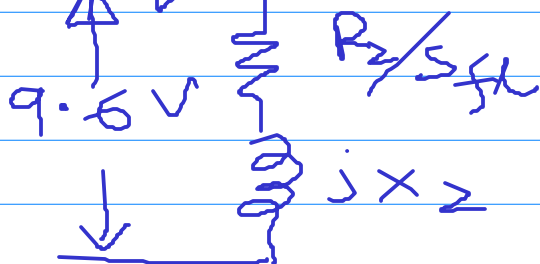$$\text{Power/phase} = 124333 \, W$$

$$V_{LL} = 415V \, (rms) \Rightarrow V_{phase} = 239.6V$$

$$S_{max} = \frac{R_2}{X_2} = 0.12$$

$$X_2 = \frac{R_2}{0.12} = \underline{8.33 R_2}$$

At rated torque $S_{fl} = 0.03$

$$\frac{R_2}{S_{fl}} = 33.33 R_2$$



$$\bar{V}_{ph} = 239.6V$$

$R_2/S_{fl}$

$jX_2$

$n_1 = 1$

$$\tan\phi = \frac{X_2}{R_2/S_{fl}}$$

$$\phi = 14°$$

$$V_{ph} \, I_2 \, \cos 14° = 124333$$

$$I_2 = \frac{124333}{239 \cdot 6 \times 0 \cdot 97} = 535 A$$

$$\boxed{\frac{R_2}{S_{fe}} = \frac{R_2 + Reat_2}{S_1}}$$

$$n_{rotor} = 1200 \, rpm \quad S_1 = \frac{1500 - 1200}{1500}$$

$$= 0 \cdot 2$$

$$|I| = \frac{V_{ph}}{\sqrt{\left(\frac{R_2}{S_{fe}}\right)^2 + X_2^2}} = \frac{239 \cdot 6}{R_2 \sqrt{33 \cdot 33^2 + 8 \cdot 33^2}}$$

$$= 535 A$$

$$R_2 = \frac{239 \cdot 6}{535 \times \sqrt{33 \cdot 33^2 + 8 \cdot 33^2}}$$

$$= \underline{\underline{13 \, m\Omega}}$$

$$Reat_2 = S_1 \left(\frac{R_2}{S_{fe}}\right) - R_2$$

$$= \frac{\cdot 2 \times \cdot 013}{\cdot 03} - \cdot 013$$

$$= 73 \cdot 6 \, m\Omega$$

$$\omega_{rotor} = 1200 \text{rpm} \qquad T = T_{Fe}$$

R

$$V_{cat_1}/\text{Phase} = 73 \cdot 6 \, m\sqrt{2} \times 535A$$
$$= 39 \cdot 41V$$

$|I_2| = 535$

535A

N 39·4V
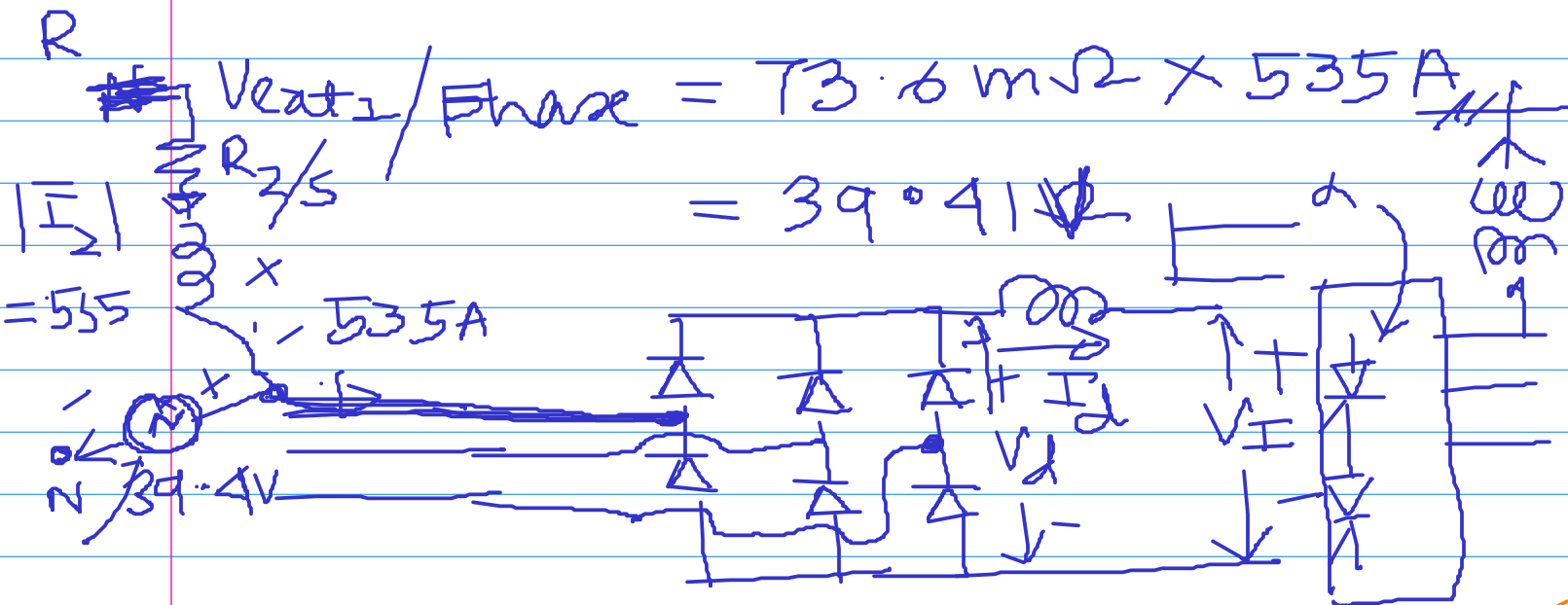


$$3 \times 39 \cdot 4 \times 535 \times \cos 14° = 61358W$$

Amount of def power we receives

$$V_d I_d = 61358W$$
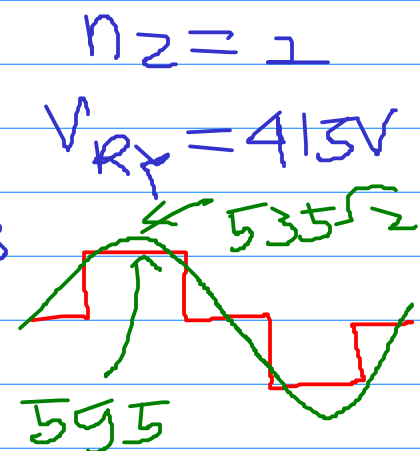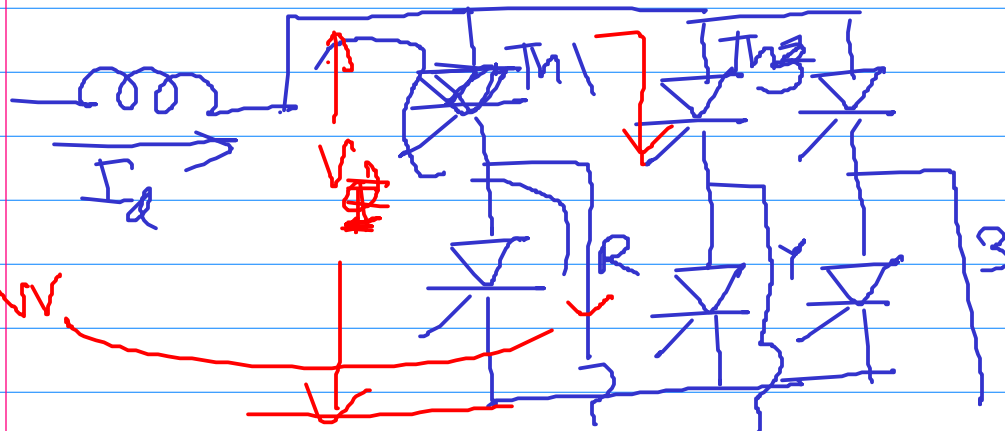
$$\frac{4 I_d}{\pi \times \sqrt{2}} = 535$$

535A

$$I_d = \frac{535 \times \pi \times \sqrt{2}}{4} = 594A$$
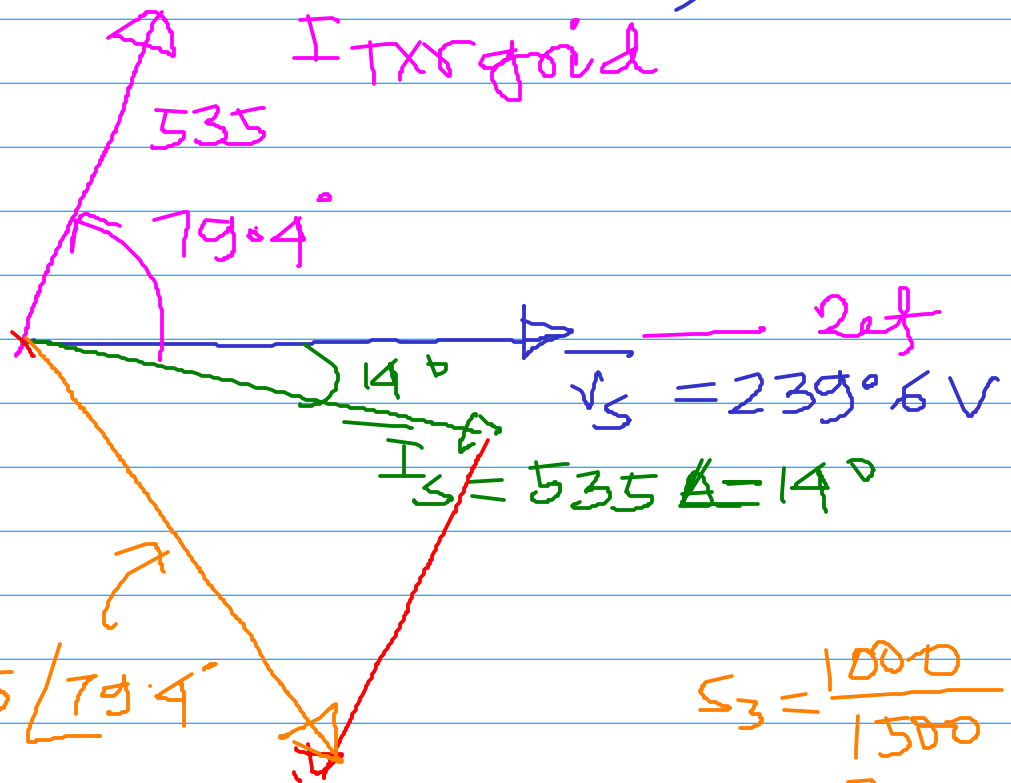
$$V_d = \frac{61358}{594} = 103 \cdot 25V$$

$I_d$

$$n_2 = 1$$
$$V_{Rr} = 415V$$

$I_{TXorINV}$

$535\sqrt{2}$

594

$$415 \times 1.35 \cos \alpha = 103.25$$

$$\cos \alpha = .184$$

$$\alpha = 79.4° \text{ (leading)}$$

$I_{Txr\,grid}$
$= n2\, I_{Txr\,inv}$

$n2 = 1$

$\dfrac{415}{\sqrt{3}} \times n_2$

$I_{Txr\,inv}$

$I_{Txr\,grid}$

535

79.4°

14°

$V_S = 239.6\,V$

$I_S = 535 \angle = 14°$

2 et

$I_{Total\,grid}$
$= 535 \angle{-14°} - 535 \angle 79.4°$
$= 778 \angle{-57°}$

$S_3 = \dfrac{1000}{1500} = \dfrac{2}{3}$

$$\dfrac{R_{ext3} + .013}{\left(\dfrac{2}{3}\right)} = \dfrac{.013}{.03}$$

$R_{ext3} = 0.276\,\Omega$

$V_{ext3} = 0.276 \times 535 = 147.6\,V$

$= 229\,862\,W$

$P_{recovered}$

$V_d = \dfrac{229862}{594} = 387\,V$

$$1.35 \times 415 \cos\alpha_3 = 387V$$

$$\alpha_3 = 46.3°$$

$I_{Txrqoid}$

$46.3°$

$V_S$

$I_S$

$I_{Total\,qoid}$

$-I_{Txrqoid}$