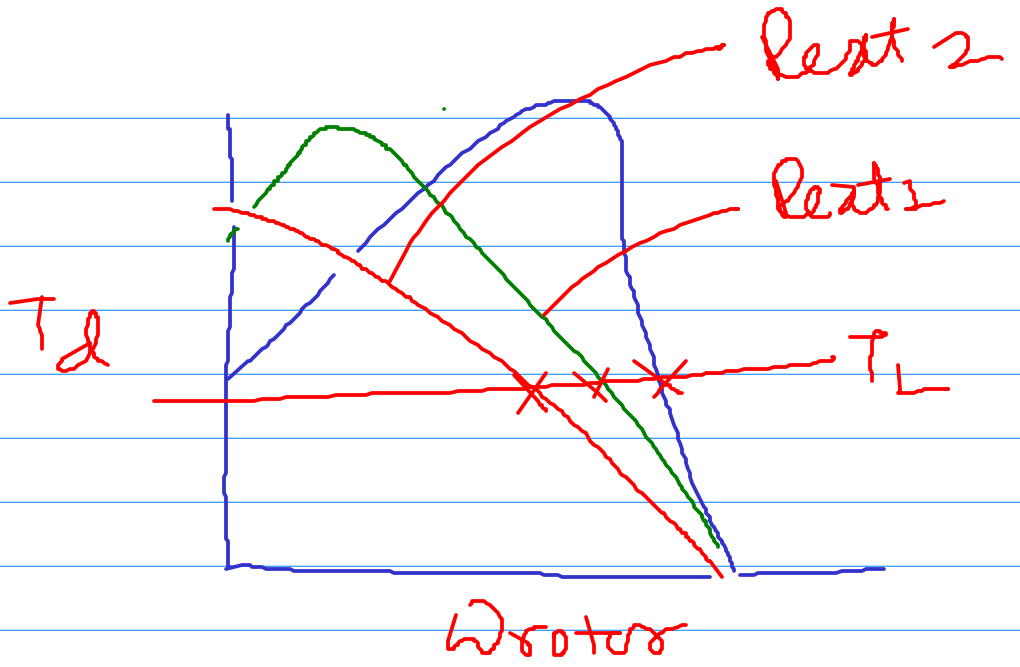


$V = I_{rotor} R_{rotor}$

500hp $\Rightarrow$ 500 × 746W = 373000W

Power/phase = 124333 W

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

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

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

At rated torque $s_{fl} = 0.03$

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

$\bar{I}_2$

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

R_2/s_{fl}

jX_2

$n_1 = 1$

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

$\phi = 14^\circ$

$$V_{ph} I_2 \cos 14^\circ = 124333$$

$$I_2 = \frac{124333}{239.6 \times 0.97} = 535\,A$$

$$\frac{R_2}{S_{fe}} = \frac{R_2 + Real_1}{S_1}$$

$$\Omega_{rotor} = 1200\,rpm \qquad S_1 = \frac{1500 - 1200}{1500}$$

$$= 0.2$$

$$|I| = \frac{V_{ph}}{\sqrt{\left(\frac{R_2}{S_{fe}}\right)^2 + X_2^2}} = \frac{239.6}{R_2\sqrt{33.33^2 + 8.33^2}}$$

$$= 535\,A$$

$$R_2 = \frac{239.6}{535 \times \sqrt{33.33^2 + 8.33^2}}$$

$$= 13\,m\Omega$$

$$Real_1 = S_1\left(\frac{R_2}{S_{fe}}\right) - R_2$$

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

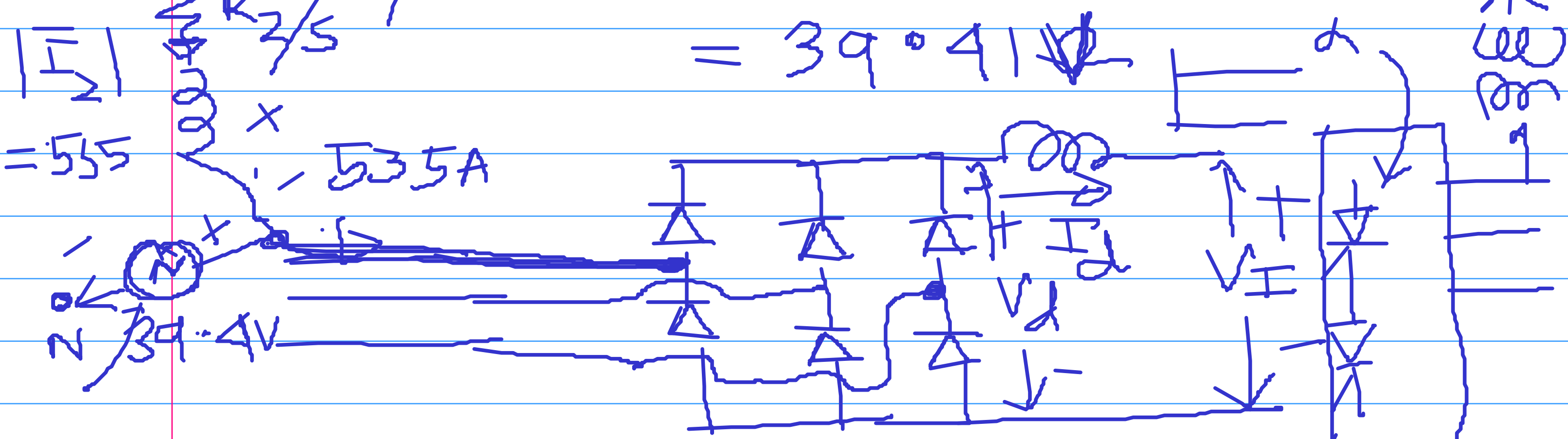
$$= 73.6\,m\Omega$$

$\omega_{rotor} = 1200\,rpm \qquad T = T_{FL}$

$V_{cat_1}/\text{Phase} = 73.6\,m\Omega \times 535\,A$

$= 39.41\,V$

$|I_2| = 535$



$3 \times 39.4 \times 535 \times$ ~~$\cos 14°$~~ $=$ ~~61358 W~~

Amount of def power we receive 63237 W

$V_d I_d =$ ~~61358 W~~ 63237 W

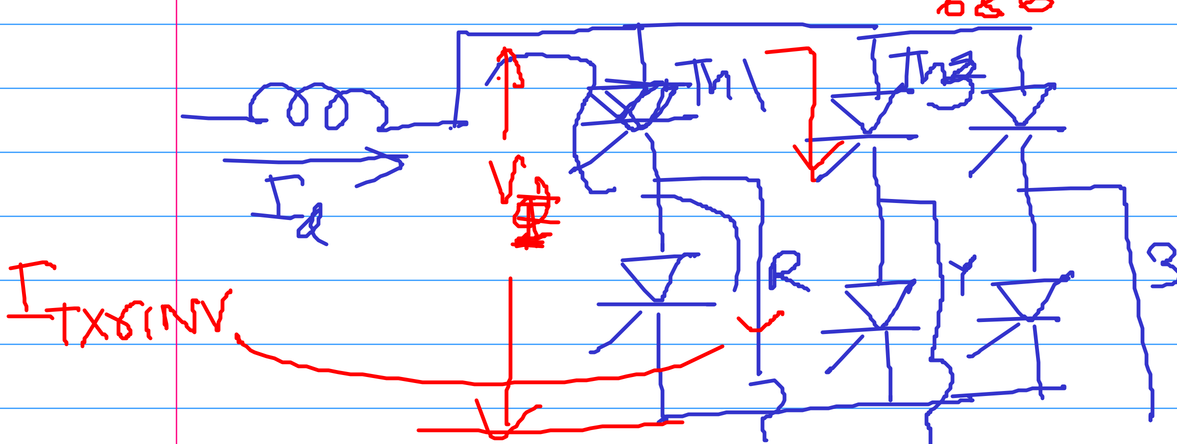
$\frac{4 I_d \times \sin(60°)}{\pi \times \sqrt{2}} = 535$

$I_d = \frac{535 \times \pi \times \sqrt{2}}{4 \times \sin 60°} = 594\,A \times \frac{2}{\sqrt{3}} = 686\,A$

$V_d =$ ~~$\frac{61358}{594}$~~ $=$ ~~103.25 V~~ $= \frac{63237}{686} = 92.1822\,V$

$n_2 = 1$

$V_{RY} = 415\,V$

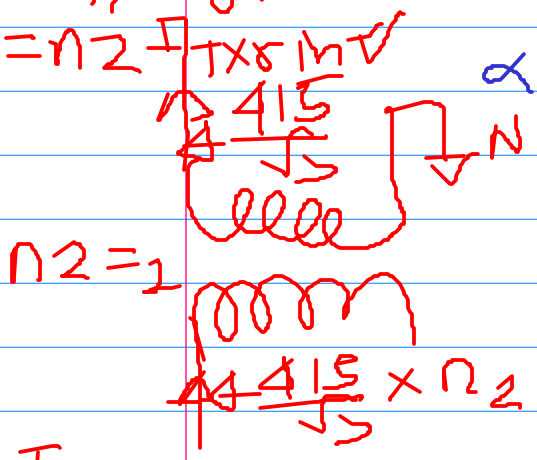


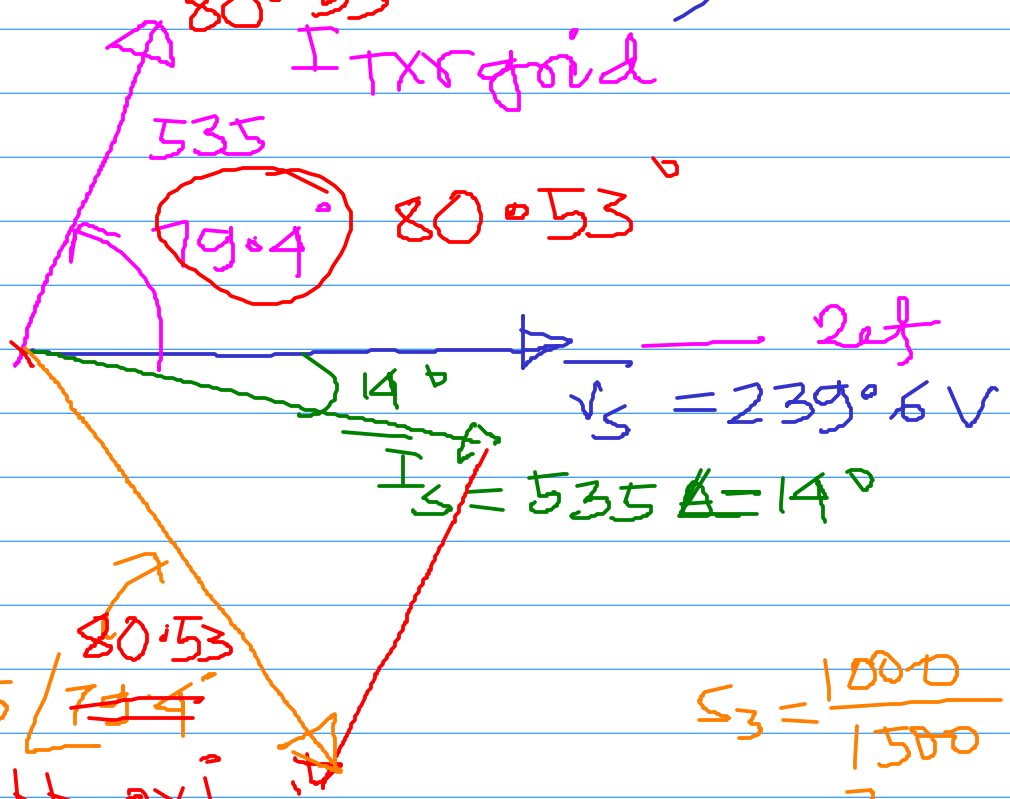
$415 \times 1.035 \cos\alpha = 183.25$ 92.18 V

$I_{TX\,grid} = n_2 I_{TX\,inv}$

$\cos\alpha = 184$ .164

$\alpha = 79.4°$ (leading)





$I_{Total\,grid}$

$= 535\angle -14° - 535\angle 79.4°$

$= 778\angle -57°$ (Approximate)

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

$$\frac{Real_3 + .013}{(2/3)} = \frac{.013}{.03}$$

$Real_3 = 0.276\,\Omega$

$V_{Real_3} = 0.276 \times 535 = 147.6$ V

$P_{received} = 229\,862$ W

$V_d = \frac{229862}{686} = 335$ V

$135 \times 415 \cos\alpha_3 = \cancel{387V}\ 355$

$\alpha_3 = \cancel{46^\circ}\ 53.27^\circ$