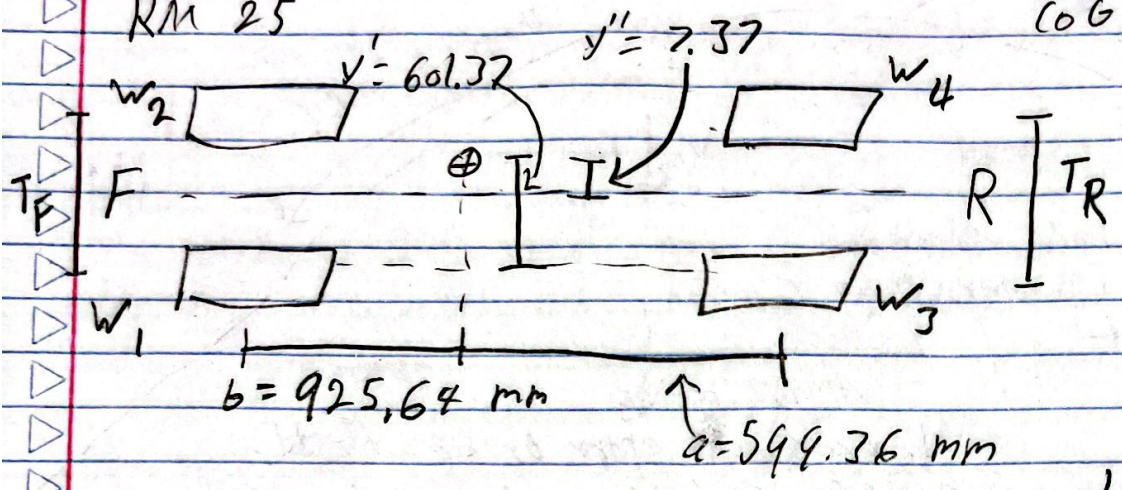
Four wheel model

RM 25

CoG $h = 323.879$ mm



$T_F = 1228$ mm

$T_R = 1188$ mm

$L = 1525$ mm

offset ratio $= \gamma = \frac{y''}{t/2}$

$C_{X_1} = \frac{1}{2}(1 - \gamma_F)$ $\quad C_{X_2} = \frac{1}{2}(1 + \gamma_F)$

$C_{X_3} = \frac{1}{2}(1 - \gamma_R)$ $\quad C_{X_3} = \frac{1}{2}(1 - \gamma_R)$

ΔW = weight transfer (long) $\quad A_X = a_x / g$

$\Delta W_1 = -C_{X_1}(W)\left(\frac{h}{L}\right)A_X$ $\quad \Delta W_2 = -C_{X_2}(W)\left(\frac{h}{L}\right)A_X$

$\Delta W_3 = C_{X_3}(W)\left(\frac{h}{L}\right)A_X$ $\quad \Delta W_4 = C_{X_4}(W)\left(\frac{h}{L}\right)A_X$

AERO LOADS:

Front lift: $LF = C_{LF}\,qA$

Rear lift: $LR = C_{LR}\,qA$

A - refrence frontal Area

q - dynamic pressure

L - wheelbase

Pitching moment: $PM = C_{PM}\,qAL = \left(C_{LF} - \frac{1}{2}C_L\right)qAL$

Rolling moment: $RM = C_{RM}\,qAL = \left(\frac{1}{2}C_L - C_{LR}\right)qAL$

$C_{PM} = C_{LF} - \frac{1}{2}C_L$

$C_{RM} = \frac{1}{2}C_L - C_{LR}$

k_R = rear roll rate = 4619.720 $\frac{lbf\cdot ft}{rad}$

k_f = front roll rate = 22315.3 $\frac{lbf\cdot ft}{rad}$

Justin has 47% mass on front

$$\Delta W_1 = -\frac{LF}{2} - \frac{k_F}{k_F + k_R}\left(\frac{RM}{t_f}\right)$$

$$\Delta W_2 = -\frac{LF}{2} + \frac{k_F}{k_F + k_R}\left(\frac{RM}{t_f}\right)$$

$$\Delta W_3 = \frac{-LR}{2} - \frac{k_R}{k_F + k_R}\left(\frac{RM}{t_R}\right)$$

$$\Delta W_4 = -\frac{LR}{2} + \frac{k_R}{k_F + k_R}\left(\frac{RM}{t_R}\right)$$