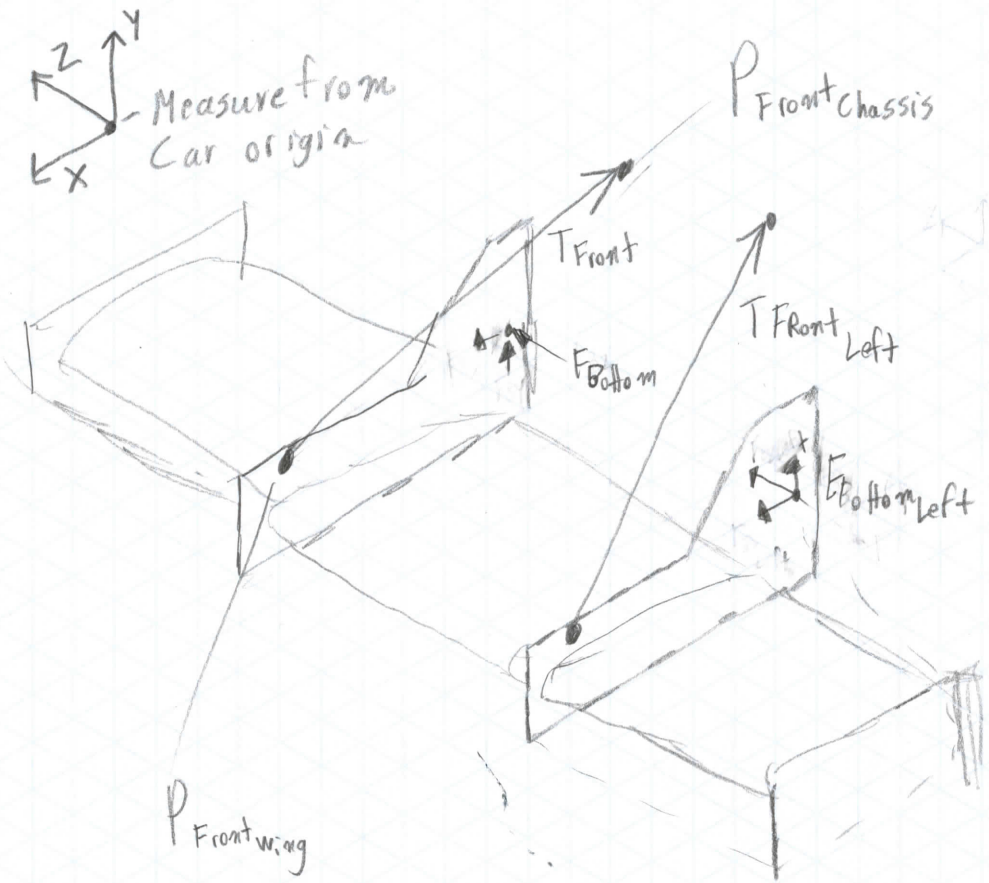
Conventions:

- Naming:
  - P___ : a point, measured from origin. Vector.
  - L___ : a line of action, but NOT a unit vector. Vector.
  - T___ : a tension force which acts along a line of action. Scalar
  - F___ : a vector force.

- FBD odds

 ; a 3D vector force

Front Aero Mount Analysis



System: Front Wing
Time: Rate
Property: Lin. Momentum

$$\frac{d}{dt}\vec{P}_{sys} = \sum\vec{F} + \cancel{\sum \dot{m}\vec{V}}^{\,0}$$

$$\downarrow$$

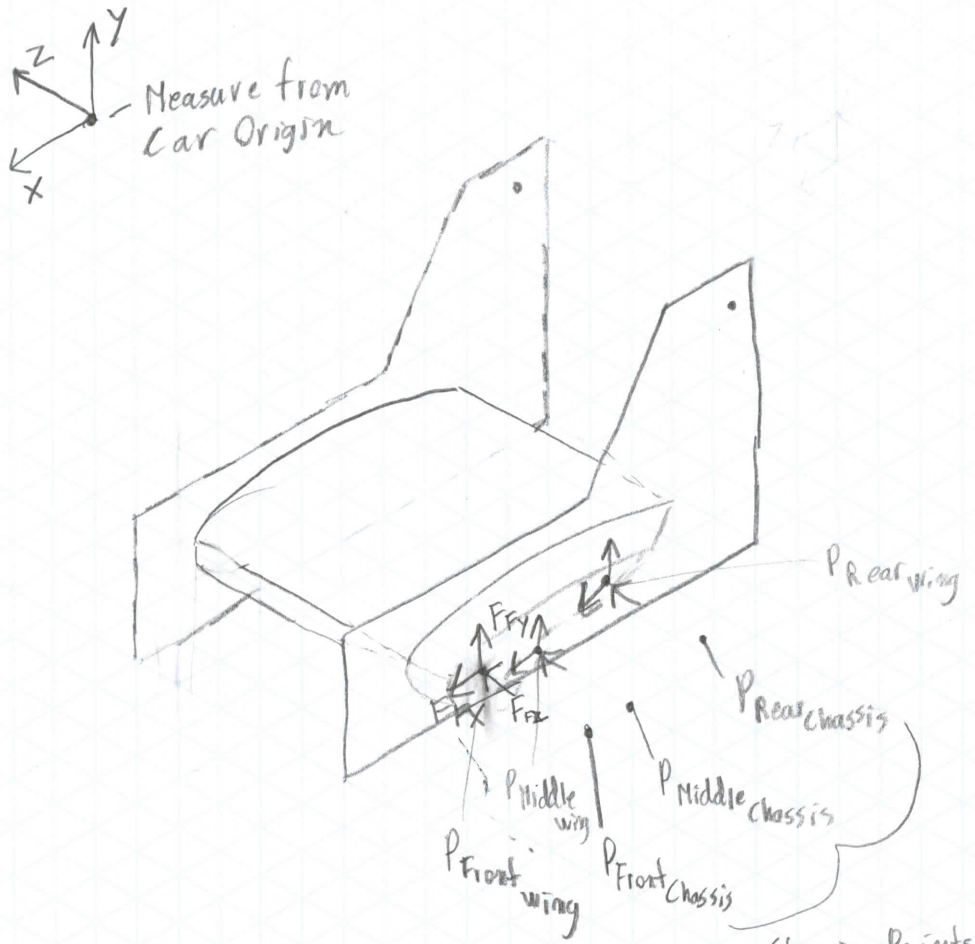
$$m\vec{a} = \sum\vec{F}$$

Property: Ang. Momentum About Car origin

$$\frac{d}{dt}\vec{L}_{sys} = \sum\vec{M} + \cancel{\sum \dot{m}(\vec{r}\times\vec{V})}^{\,0}$$

$$m(\vec{COM}\times\vec{a}) = \sum \vec{r}\times\vec{F}$$

Side Aero Mount Analysis



System: Side Wing
Time: Rate

Property: Lin. Momentum

$$\frac{d}{dt}\vec{P}_{sys} = \sum\vec{F} + \sum \dot{m}\vec{v}^{\,0}$$

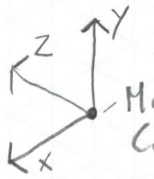
$$m\vec{a} = \sum\vec{F}$$

Property: Ang. Momentum About Car origin

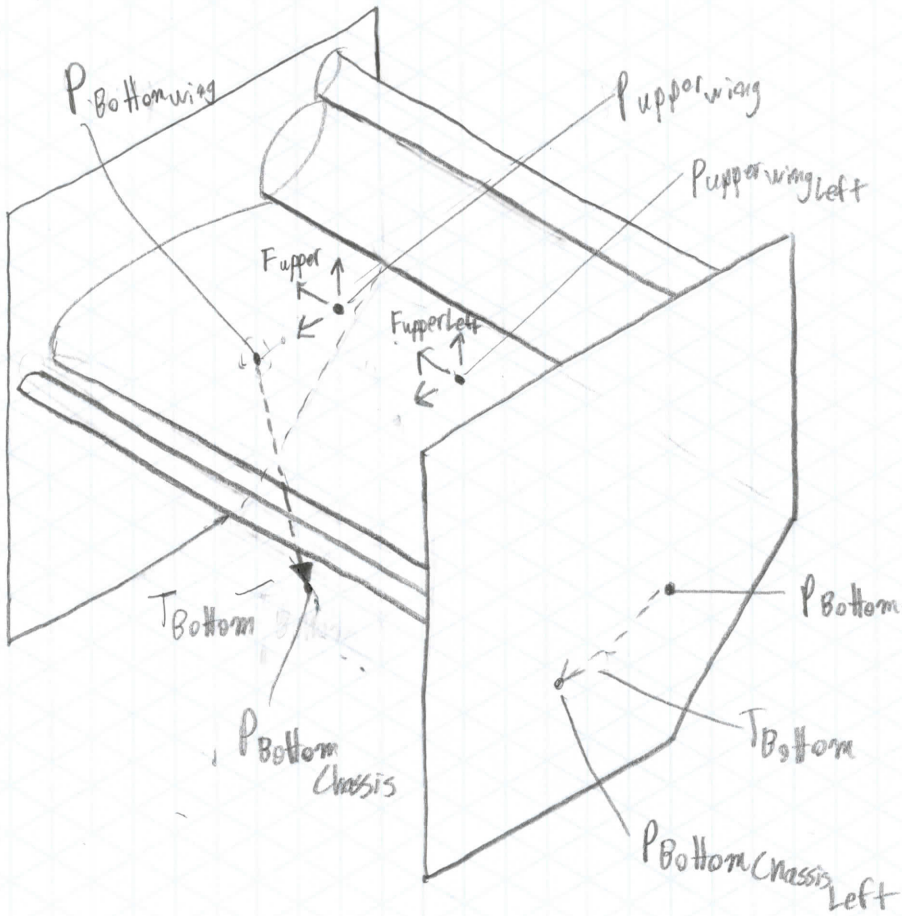
$$\frac{d}{dt}\vec{L}_{sys} = \sum\vec{M} + \sum \dot{m}^{0}(\vec{r}\times\vec{v})$$

$$m(\vec{COM}\times\vec{a}) = \sum\vec{r}\times\vec{F}$$

Rear Aero Mount Analysis



Measure from Car origin



System: Rear Wing
Time: Rate
Property: Lin. Momentum

$$\frac{d}{dt}\vec{P}_{sys} = \sum \vec{F} + \sum \dot{m}\vec{V}$$

$$\downarrow$$

$$m\vec{a} = \sum \vec{F}$$

Property: Ang. Momentum About Car Origin

$$\frac{d}{dt}\vec{L}_{sys} = \sum \vec{M} + \sum \dot{m}(\vec{r} \times \vec{V})$$

$$m(\vec{COM} \times \vec{a}) = \sum \vec{r} \times \vec{F}$$