Velocity Analysis:

Must know a driving velocity. Assume that the known velocity is the angular velocity of W,

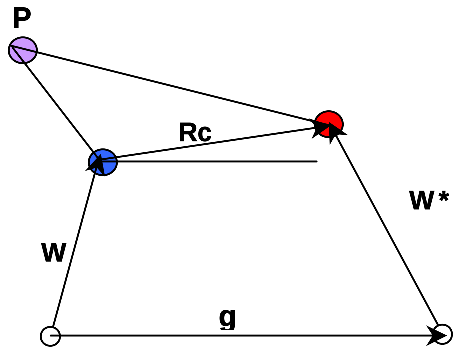
$$\dot{q}_W$$

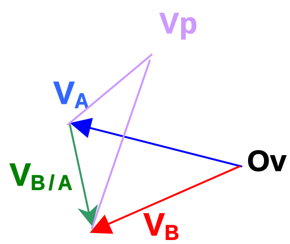
$$\vec{W}+\vec{R}_c=\vec{G}+\vec{W}*$$

$$We^{iq_W}+R_c e^{iq_{RC}}=Ge^{iq_G}+W*e^{iq_{W*}}$$

$$\frac{d}{dt}\left(We^{iq_W}+R_c e^{iq_{RC}}=Ge^{iq_G}+W*e^{iq_{W*}}\right)$$

$$i\dot{q}_W We^{iq_W}+i\dot{q}_{R_C}R_c e^{iq_{RC}}=i\dot{q}_{W*}W*e^{iq_{W*}}$$





What are the unknowns in the velocity analysis?

$$\dot{q}_{W*},\dot{q}_{R_c}$$

How can you find these values?

$$i\dot{q}_W We^{iq_W}+i\dot{q}_{R_C}R_c e^{iq_{RC}}=i\dot{q}_{W*}W*e^{iq_{W*}}$$

Divide into **Real** and **Imaginary**

$$-\dot{q}_W W\sin(q_W)-\dot{q}_c R_c\sin(q_{R_c})=-\dot{q}_{W*}W*\sin(q_{*W})$$

$$\dot{q}_W W\cos(q_W)+\dot{q}_c R_c\cos(q_{R_c})=+\dot{q}_{W*}W*\cos(q_{*W})$$

$$\begin{bmatrix} R_c\sin(q_{R_c}) & -W^*\sin(q_{W*}) \\ R_c\cos(q_{R_c}) & -W^*\cos(q_{W*}) \end{bmatrix}\begin{Bmatrix} \dot{q}_{R_C} \\ \dot{q}_{W*} \end{Bmatrix}=\begin{Bmatrix} -\dot{q}_W W\sin(q_W) \\ -\dot{q}_W W\cos(q_W) \end{Bmatrix}$$

Solve this problem for position and velocity unknowns; assume r2 is driving and that its angular velocity, θr2_dot, is known.