Sky-hook model reference
$$\vec{w} \longrightarrow \vec{x}_m = \mathbf{A}_m \vec{x}_m + \mathbf{B}_m \dot{w} + \begin{bmatrix} 0 \\ -1 \end{bmatrix} \ddot{w} \qquad \vec{e}$$

$$\vec{k}_p = \mathbf{A}_p \vec{x}_p + \mathbf{B}_p u + \begin{bmatrix} 0 \\ -1 \end{bmatrix} \ddot{w} \qquad \vec{x}_p$$

$$\vec{k}_p = -(\vec{x}_p^T \mathbf{B}_m^T \mathbf{P} \vec{e}) \mathbf{M}^{-1}$$

$$\vec{k}_r = -n^{-1} k_r^2 u (\mathbf{B}_m^T \mathbf{P} \vec{e})$$