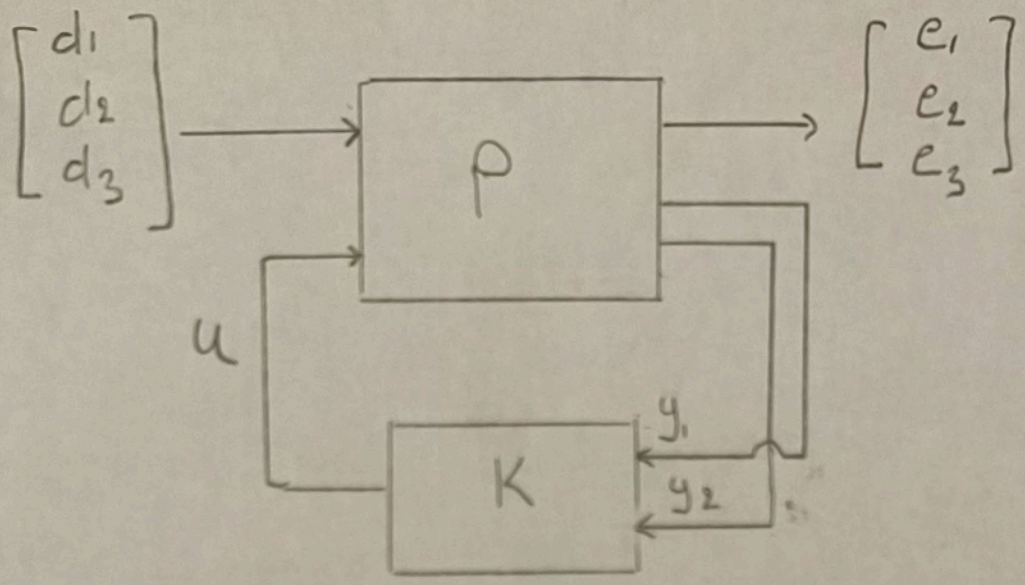
d1
d2
d3
P
e1
e2
e3
u
K
y1
y2

$$
\begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ y_1 \\ y_2 \end{bmatrix} = \overbrace{\left[\begin{array}{c|c|c} 0 & 0 & 0 \\ W_{sd} G_{21} W_{road} & 0 & 0 \\ W_{ab} G_{31} W_{road} & 0 & 0 \\ \hline G_{21} W_{road} & W_{d2} & 0 \\ G_{31} W_{road} & 0 & W_{d3} \end{array}\right]}^{\begin{matrix} P_{11} & & P_{12} \end{matrix}} \overbrace{\left[\begin{array}{c} W_{act} \\ W_{sd} G_{22} Act \\ W_{ab} G_{32} Act \\ \hline G_{22} Act \\ G_{32} Act \end{array}\right]}^{P_{12}} \begin{bmatrix} d_1 \\ d_2 \\ d_3 \\ u \end{bmatrix}
$$

P_{21} P_{22}

$$
\begin{bmatrix} E \\ Y \end{bmatrix} = \begin{bmatrix} P_{11} & P_{12} \\ P_{21} & P_{22} \end{bmatrix} \begin{bmatrix} D \\ u \end{bmatrix}, \quad E = \begin{bmatrix} e_1 \\ e_2 \\ e_3 \end{bmatrix}, \quad Y = \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}
$$

$$
D = \begin{bmatrix} d_1 \\ d_2 \\ d_3 \end{bmatrix}.
$$

OK

OK

$$P_{11} = \left[\begin{array}{c|c|c} 0 & 0 & 0 \\ \hline W_{sd}\, G_{21}\, W_{road} & 0 & 0 \\ \hline W_{ab}\, G_{31}\, W_{road} & 0 & 0 \end{array}\right]$$

$$P_{12} = \begin{bmatrix} W_{act} \\ W_{sd}\, G_{22}\, Act \\ W_{ab}\, G_{32}\, Act \end{bmatrix}$$

$$P_{21} = \left[\begin{array}{c|c|c} G_{21}\, W_{road} & W_{d2} & 0 \\ \hline G_{31}\, W_{road} & 0 & W_{d3} \end{array}\right]$$

$$P_{22} = \left[\begin{array}{c} G_{22}\, Act \\ \hline G_{32}\, Act \end{array}\right]$$

$$K = \begin{bmatrix} K_1 & K_2 \end{bmatrix}$$

OK

$$Y = \left[I_{2\times 2} - P_{22} K \right]^{-1} P_{21} D$$

Amisi

$$E = {}_3P_{11}\,{}_3D + {}_3\left[P_{12} K \left[I_{2\times 2} - P_{22} K \right]^{-1} P_{21} \right] {}_3D.$$

$$E = \left[P_{11} + P_{12} K \left[I_{2\times 2} - P_{22} K \right]^{-1} P_{21} \right] D$$

$$E/D = F_p(P, K) = 3\left[P_{11} + P_{12} K \left[I_{2\times 2} - P_{22} K \right]^{-1} P_{21} \right]$$

OK

$$\left[I_{2\times 2} - P_{22}K\right] = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} G_{122}\,Act \\ G_{132}\,Act \end{bmatrix} \begin{bmatrix} K_1 & K_2 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} G_{122}K_1\,Act & G_{122}K_2\,Act \\ G_{132}K_1\,Act & G_{132}K_2\,Act \end{bmatrix}$$

$$\left[I_{2\times 2} - P_{22}K\right] = \begin{bmatrix} \overset{a}{1 - G_{122}K_1\,Act} & \overset{b}{-G_{122}K_2\,Act} \\ \overset{c}{-G_{132}K_1\,Act} & \overset{d}{1 - G_{132}K_2\,Act} \end{bmatrix} = M$$

$$\left[I_{2\times 2} - P_{22}K\right]^{-1} = \frac{1}{Det\,M}\,(com\,M)^T$$

$$Det\,M = 1 - G_{132}K_2\,Act - G_{122}K_1\,Act$$

$$(com\,M) = \begin{bmatrix} d & -c \\ -b & a \end{bmatrix} \qquad (com\,M)^T = \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

$$M^{-1} = \frac{1}{1 - G_{132}K_2\,Act - G_{122}K_1\,Act} \begin{bmatrix} 1 - G_{132}K_2\,Act & G_{122}K_2\,Act \\ G_{132}K_1\,Act & 1 - G_{122}K_1\,Act \end{bmatrix}$$

$$\left[I_{2\times 2} - P_{22}K\right]^{-1} = \left[\begin{array}{c|c} \overset{M_1}{\dfrac{1 - G_{132}K_2\,Act}{1 - G_{132}K_2\,Act - G_{122}K_1\,Act}} & \overset{M_2}{\dfrac{G_{122}K_2\,Act}{1 - G_{132}K_2\,Act - G_{122}K_1\,Act}} \\ \hline \underset{M_3}{\dfrac{G_{132}K_1\,Act}{1 - G_{132}K_2\,Act - G_{122}K_1\,Act}} & \underset{M_4}{\dfrac{1 - G_{122}K_1\,Act}{1 - G_{132}K_2\,Act - G_{122}K_1\,Act}} \end{array}\right]$$

OK

OK

Suite

$$P_{12} K M^{-1} = \left[\begin{array}{c|c} W_{act} K_1 & W_{act} K_2 \\ W_{Sd} G_{122} Act K_1 & W_{Sd} G_{122} Act K_2 \\ W_{ab} G_{132} Act K_1 & W_{ab} G_{132} Act K_2 \end{array}\right] \begin{bmatrix} M_1 & M_2 \\ M_3 & M_4 \end{bmatrix}$$

$$= \left[\begin{array}{c|c} W_{act} K_1 M_1 + W_{act} K_2 M_3 & W_{act} K_1 M_2 + W_{act} K_2 M_4 \\ \hline W_{Sd} G_{122} Act K_1 M_1 + W_{Sd} G_{122} Act K_2 M_3 & W_{Sd} G_{122} Act K_1 M_2 + W_{Sd} G_{132} Act K_2 M_4 \\ \hline W_{ab} G_{132} Act K_1 M_1 + W_{ab} G_{132} Act K_2 M_3 & W_{ab} G_{132} Act K_1 M_2 + W_{ab} G_{132} Act K_2 M_4 \end{array}\right]$$

$P_{12} K M^{-1} P_{211} =$

OK

$$P_{12} K M^{-1} \cdot P_{21} = \begin{bmatrix} W_{act}(K_1 M_1 + K_2 M_3) \cdot G_{T21} W_{road} + W_{act}(K_1 M_2 + K_2 M_4) G_{T31} W_{road} & W_{act}(K_1 M_1 + K_2 M_3) W_{d2} & W_{act}(K_1 M_2 + K_2 M_4) W_{d3} \\ W_{Scl} G_{T22} Act(K_1 M_1 + K_2 M_3) G_{T21} W_{road} + W_{Scl} G_{T22} Act(K_1 M_2 + K_2 M_4) \cdot G_{T31} W_{road} & W_{Scl} G_{T22} Act(K_1 M_1 + K_2 M_3) W_2 & W_{Scl} G_{T22} Act(K_1 M_2 + K_2 M_4) W_{d3} \\ W_{ab} G_{T32} Act(K_1 M_1 + K_2 M_3) G_{T21} W_{road} + W_{ab} G_{T32} Act(K_1 M_2 + K_2 M_4) G_{T31} W_{road} & W_{ab} G_{T32} Act(K_1 M_1 + K_2 M_3) \cdot W_2 & W_{ab} G_{T32} Act(K_1 M_2 + K_2 M_4) W_{d3} \end{bmatrix}$$

ok

ok

$F(P,K) = E/D$

$K = [K_1 \quad K_2]$.

$E = P_{11} D + P_{12} u$

$u = K_1 y_1 + K_2 y_2 = \underbrace{[K_1 \quad K_2]} \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$

$= K \cdot Y$

$u = KY$

Amisi

$$\begin{cases} E = P_{11} D + P_{12} u \\ Y = P_{21} D + P_{22} u \end{cases}$$

$$Y = P_{21} D + P_{22} KY$$

$$Y - P_{22} KY = P_{21} D$$

$$[I_{2\times 2} - P_{22} K] Y = P_{21} D$$

$$Y = [I_{2\times 2} - P_{22} K]^{-1} P_{21} D$$

PK

$$F(P,K) = \begin{bmatrix} W_{act}(K_1 M_1 + K_2 M_3) G_{T21} W_{road} + W_{act}(K_1 M_2 + K_2 M_4) G_{T31} W_{road} & W_{act}(K_1 M_1 + K_2 M_3) W_{d2} & W_{act}(K_1 M_2 + K_2 M_4) W_{d3} \\ W_{sd} G_{T22} Act(K_1 M_1 + K_2 M_3) G_{T21} W_{road} + W_{sd} G_{T22} Act(K_1 M_2 + K_2 M_4) G_{T31} W_{road} + W_{sd} G_{T21} W_{road} & W_{sd} G_{T22} Act(K_1 M_1 + K_2 M_3) W_{d2} & W_{sd} G_{T22} Act(K_1 M_2 + K_2 M_4) W_{d3} \\ W_{ab} G_{T32} Act(K_1 M_1 + K_2 M_3) G_{T21} W_{road} + W_{ab} G_{T32} Act(K_1 M_2 + K_2 M_4) G_{T31} W_{road} + W_{ab} G_{T31} W_{road} & W_{ab} G_{T32} Act(K_1 M_1 + K_2 M_3) W_{d2} & W_{ab} G_{T32} Act(K_1 M_2 + K_2 M_4) W_{d3} \end{bmatrix}$$

OK