

## MPC

### Offline

- Compute observer gains ( $L_1$  and  $L_2$ )
- Specify setpoint (ref)
- Develop model (ss2\_PRBS\_MIMO)
- Cost function specification ( $J$ )
- Constraint specification

### Online

- Predict window (N samples)
- Find optimal output ( $u$ )
- Update output ( $u$ )

run\_mpc\_MIMO.m

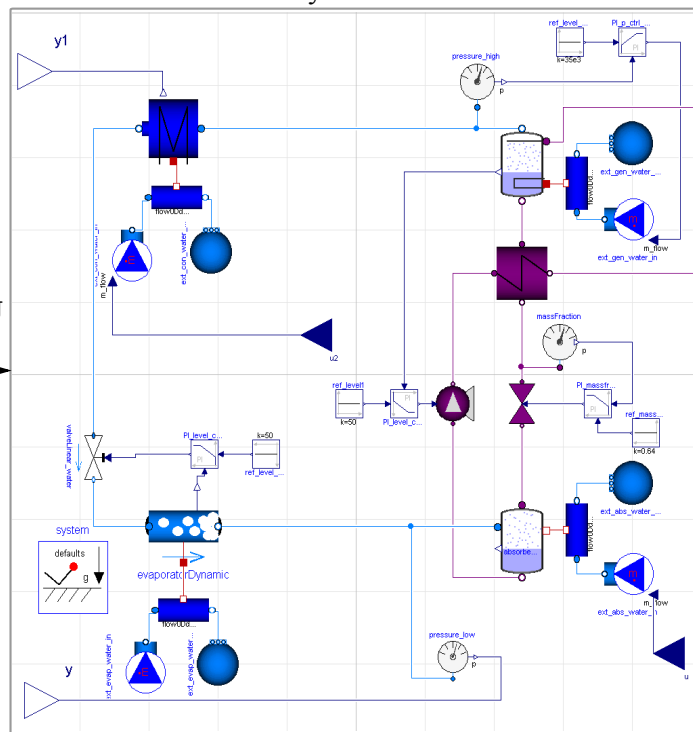
$$\begin{bmatrix} p_{10\_offset} \\ LC\_offset \\ COP_{inv\_offset} \end{bmatrix} \cdot$$

$z^{-1}$

$u_{small}$

$$\begin{bmatrix} m_A \\ m_C \end{bmatrix} + \begin{bmatrix} m_{13\_offset} \\ m_{16\_offset} \end{bmatrix} + u_{big} \rightarrow \Sigma$$

## System



COP

$$\begin{bmatrix} p_{10} \\ LC \end{bmatrix}$$

$$\begin{bmatrix} p_{10} \\ LC \\ COP^{-1} \end{bmatrix}$$

$y_{small}$

$$\Sigma \left( \begin{matrix} + \\ - \\ * \end{matrix} \right) \begin{matrix} y_{small} \\ y_{big} \\ y \end{matrix}$$

err

$$\Sigma \left( \begin{matrix} + \\ - \end{matrix} \right) \begin{matrix} y \\ \hat{y} \end{matrix}$$

Observer

ss2\_PRBS\_MIMO

$$L_1 \quad 2 \times 3$$

$$B \quad 2 \times 2$$

$$\Sigma \left( \begin{matrix} + \\ + \end{matrix} \right) \begin{matrix} \hat{x} \\ \hat{x} \end{matrix}$$

$$z^{-1}$$

$$\hat{x}$$

$$C \quad 3 \times 2$$

$$A \quad 2 \times 2$$