AA/ECE/ME 548 Linear Multivariable Control Sp22 Prof Burden

today: ☐ course logistics, Canvas, etc
☐ exam 2
☐ questions / office hours

$$\min_{x_0,u_0} \|f(x_0,u_0)\|_2^2$$

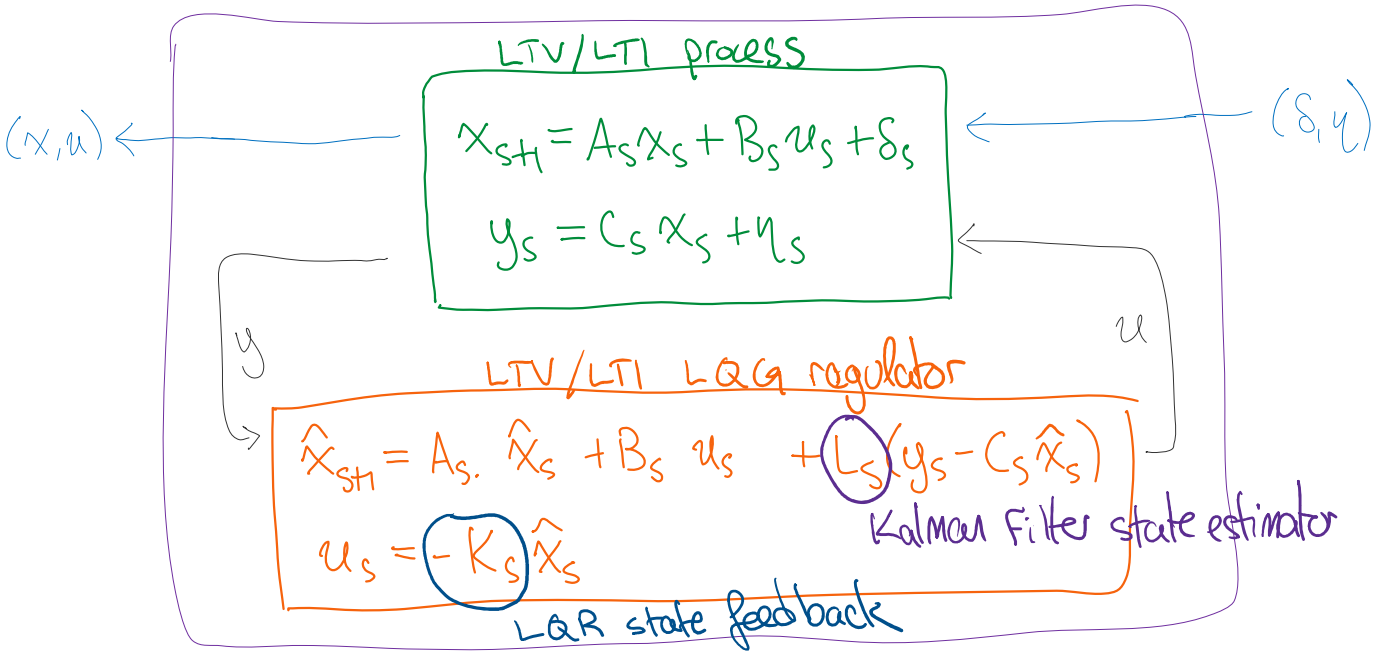
$\dot{x}/x^+ = f(x,u) \quad y = h(x,u)$
$x \in \mathbb{R}^n, \ u \in \mathbb{R}^m$

suppose $f(x_0,u_0) = 0 \ (\dot{x})$
$f(x_0,u_0) = x_0 \ (x^+)$

$\delta\dot{x}/\delta x^+ = A\delta x + B\delta u \qquad A = D_x f(x_0,u_0) \qquad B = D_u f(x_0,u_0)$
$\delta y = C\delta y + D\delta u \qquad C = D_x h(x_0,u_0) \qquad D = D_u h(x_0,y_0)$

$$\Rightarrow C = \begin{bmatrix} \partial_{x_1} h_1 & \partial_{x_2} h_1 & \cdots & \partial_{x_n} h_1 \\ \vdots & & & \\ \partial_{x_1} h_o & \partial_{x_2} h_o & \cdots & \partial_{x_n} h_o \end{bmatrix} \Bigg|_{\substack{x=x_0 \\ u=u_0}}$$

$$\left[\partial_{x_1} h_0 \quad \partial_{x_2} h_0 \quad \cdots \quad \partial_{x_n} h_0\right]\Big|_{\substack{x=x_0 \\ u=u_0}}$$



$$u = -Kx$$