Summary of design process

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Bretl

$\dot{n} = f(n, u)$

$\downarrow$

$0 = f(n_e, u_e)$

$\downarrow$

$\dot{x} = Ax + Bu$ $\leftarrow$ $x = n - n_e$ $\quad u = u - u_e$

$A = \left.\frac{\partial f}{\partial n}\right|_{n_e, u_e}$ $\quad B = \left.\frac{\partial f}{\partial u}\right|_{n_e, u_e}$

$\downarrow$

$u = -Kx$

$\downarrow$

$\dot{x} = (A - BK)x$

$\downarrow$

$x(t) = e^{(A-BK)t} x(0)$ $\longrightarrow$

asymptotically stable

$\downarrow$

$x(t) \to 0 \quad \text{as} \quad t \to \infty$

$\uparrow$

this is true if and only if all eigenvalues of $A - BK$ have negative real part