COHERENCE FUNCTION

$$\gamma^2(\omega) = \frac{|\Phi_{yu}(\omega)|^2}{\Phi_y(\omega)\,\Phi_u(\omega)} \qquad 0 \le \gamma^2 \le 1$$

PURE LINEAR SYSTEM : $\left[\gamma^2 \equiv 1\right]$

$\gamma^2 < 1$: NOISES
LEAKAGE
NL
OTHER INPUTS
...

FOR PERIODIC INPUTS:

$$\gamma^2(\omega_k) = \frac{\left|\frac{1}{M}\sum Y^{(l)}\overline{U}^{(l)}\right|^2}{\left(\frac{1}{M}\sum|U^{(l)}|^2\right)\left(\frac{1}{M}\sum|Y^{(l)}|^2\right)} \qquad \begin{array}{l} U = U_0 + N_U \\ \text{ETC.}\end{array}$$

$$= \frac{\left|1 + \frac{\hat{\sigma}^2_{YU}(k)}{Y_0(k)\,\overline{U}_0(k)}\right|^2}{\left(1 + \frac{\hat{\sigma}^2_U(k)}{|U_0(k)|^2}\right)\left(1 + \frac{\hat{\sigma}^2_Y(k)}{|Y_0(k)|^2}\right)}$$

ASSUME:

$$\left.\begin{array}{l} \frac{\hat{\sigma}^2_U\,\hat{\sigma}^2_Y}{|U_0|^2|Y_0|^2} \ll \frac{\hat{\sigma}^2_U}{|U_0|^2} + \frac{\hat{\sigma}^2_Y}{|Y_0|^2} \\ \left|\frac{\hat{\sigma}^2_{YU}}{Y_0\,\overline{U}_0}\right| \ll 1 \end{array}\right\} \qquad \left[\begin{array}{l}\hat{\sigma}^2_G(k) = \\ = |G(j\omega_k)|^2 \cdot \frac{1-\gamma^2(\omega_k)}{\gamma^2(\omega_k)}\end{array}\right]$$