FRF (ETFE) MEASUREMENTS WITH RANDOM EXCITATIONS

BLOCKS ?

SIGNAL CHANGES IN BLOCKS !

$$G^{(l)} = \frac{Y^{(l)}}{U^{(l)}}$$

- INFINITE VARIANCE (DIRECT)
- BIAS ERRORS (NL BEHAVIOR OF DIVISION)

REDUCE NOISE BEFORE DIVISION ?

$$\mathcal{E}\{U^{(l)}(k)\} = \phi$$

CIRCULAR GAUSSIAN: RANDOM PHASE

U.C.

PHASE ELIMINATION: $U^{(l)}(k)$, $\overline{U^{(l)}(k)}$

$$\left[\hat{G}(j\omega_k) = \frac{\sum Y^{(l)}(k)\,\overline{U^{(l)}(k)}}{\sum |U^{(l)}(k)|^2}\right]$$

- DISCRETE WIENER-HOPF EQUATION
- [LS ESTIMATE OF G $\quad \Phi_{yu}(\omega) = G(\omega)\,\Phi_u(\omega)$]

MINIMAL MSE, LS, WIENER-FILTERING PROBLEM

$$\hat{y}(n) = G(q)u(n) \sim y(n)$$

$$e(n) = \hat{y}(n) - y(n)$$

$$\min_{g(n)} V = \mathcal{E}\{e^2(n)\} \quad \left(\frac{1}{N}\sum e^2(n)\right)$$

- FIR
- NON-CAUSAL
- CAUSAL FILTER

NONCAUSAL DISCRETE TIME WIENER FILTER $\quad g(n) = ?$

$$\mathcal{E}\left\{\left(\sum_{k=-\infty}^{\infty} g(k)u(n-k) - y(n)\right)^2\right\} = \phi$$

$$\frac{\partial}{\partial g(m)}$$