8 2

ℓ ?

L ? → SHAPING PROPERTIES OF PREDICTION ERROR

- REMOVE SLOW DRIFTS
- — " — HIGH-FREQ DISTURBANCES
- ENHANCE/SUPPRESS BY FREQ. WEIGHTING

OPTIMIZING ?

....

$$\varepsilon_F(t,\theta) = L(q)\,\varepsilon(t,\theta) = \underbrace{\left[L^{-1}(q)\,H(q,\theta)\right]^{-1}}_{\text{SHAPING THE NOISE}}\left[y(t) - G(q,\theta)\,u(t)\right]$$

$$\ell = \frac{1}{2}\varepsilon^2$$ — COMPUTATION / ANALYSIS

- STANDARD

→ ROBUST AGAINST BAD DATA → OTHER

- EXPLICIT WEIGHTING:

$$V_N(\theta, Z^N) = \frac{1}{N}\sum_{t=1}^{N} \beta(N,t)\,\ell(\varepsilon_F(t,\theta))$$

3. FREQUENCY-DOMAIN INTERPRETATION OF $\ell = \frac{1}{2}\varepsilon^2$ CRITERION FOR LTI SYSTEMS

$$V_N(\theta, Z^N) = \frac{1}{N}\sum_{t=1}^{N}\frac{1}{2}\varepsilon^2(t,\theta)$$

$$\varepsilon(t,\theta) = H^{-1}(q,\theta)\left[y(t) - G(q,\theta)\,u(t)\right]$$

PARSEVAL EQUALITY

$$\|FS\|^2 = \|S\|^2$$

IF F ORTHONORMAL (FOURIER IS)

$$V_N(\theta, Z^N) = \frac{1}{N}\frac{1}{2}\sum_{k=0}^{N-1}\left|E_N(2\pi k/N, \theta)\right|^2$$

WITH OVERLOOKING $O\left(\frac{1}{\sqrt{N}}\right)$ TRANSIENT TERMS

$$E_N(\omega) = H^{-1}(e^{j\omega},\theta)\left[Y_N(\omega) - G(e^{j\omega},\theta)\,U_N(\omega)\right]$$

$$V_N(\theta, Z^N) = \frac{1}{N}\sum_k \frac{1}{2}\left|H^{-1}(e^{j\frac{2\pi k}{N}},\theta)\right|^2 \left|Y_N(k) - G(e^{j\frac{2\pi k}{N}},\theta)\,U_N(k)\right|^2$$

$$= \frac{1}{N}\frac{1}{2}\sum_k \left|\hat{G}_N(e^{j\frac{2\pi k}{N}}) - G(e^{j\frac{2\pi k}{N}},\theta)\right|^2 \underbrace{\frac{|U_N(k)|^2}{\left|H(e^{j\frac{2\pi k}{N}},\theta)\right|^2}}_{Q(k,\theta)}$$

LIKE WEIGHTED LS ESTIMATE OF ETFE

$Q(k,\theta)$ FREQUENCY WEIGHTING