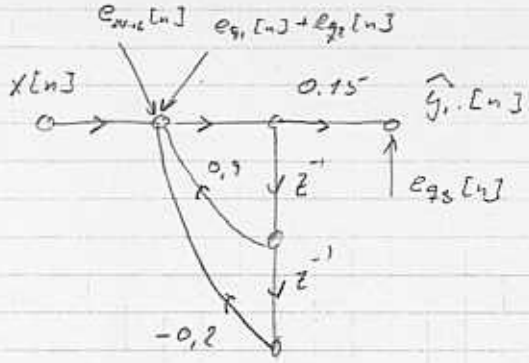
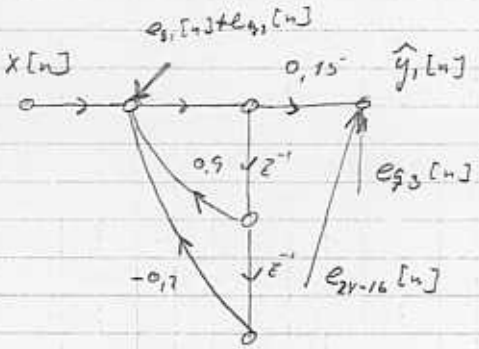
Lösningsförslag till Ops. 2 juni 99 DIGB

a)



b)



c)

I spörsmål a: $\sigma_{2V-1G}^2 = \sigma_{q_1}^2 = \sigma_{q_2}^2 = \sigma_{q_3}^2 = \frac{\Delta^2}{12} = \frac{2^{-2B}}{12}\Big/_{B=15} = 77{,}6 \cdot 10^{-12}$

I spörsmål b: $\sigma_{q_1}^2 = \sigma_{q_2}^2 = \sigma_{q_3}^2 = \frac{2^{-2B}}{12}\Big/_{B=23} = 1{,}18 \cdot 10^{-12}$

$\sigma_{2V-1G}^2 = \frac{2^{-2B}}{12}\Big/_{B=15} = 77{,}6 \cdot 10^{-12}$

d)

$$\sigma_y^2 = \left(\sigma_{q_1}^2 + \sigma_{q_2}^2\right) \frac{1}{2\pi j} \oint H_0(z) H_0(z^{-1}) z^{-1} dz + \sigma_{q_3}^2 + \sigma_{2V-1G}^2$$

$$\frac{1}{2\pi j} \oint \frac{0{,}15^2 z^2}{(z-0{,}1)(z-0{,}5)(1-0{,}1z)(1-0{,}5z)} \cdot \frac{0{,}15^2}{z^{-1}} dz$$

$$= \frac{0{,}15^2 z}{(z-0{,}5)(1-0{,}1z)(1-0{,}5z)}\Big/_{z=0{,}1} + \frac{0{,}15^2 \cdot z}{(z-0{,}1)(1-0{,}1z)(1-0{,}5z)}\Big/_{z=0{,}5}$$

$$= -0{,}131 + 0{,}188 = \underline{0{,}057}$$

$$\sigma_y^2 = 2{,}36 \cdot 10^{-15} \cdot 0{,}057 + 1{,}18 \cdot 10^{-15} + 77{,}6 \cdot 10^{-12} = \underline{77{,}6 \cdot 10^{-12}}$$