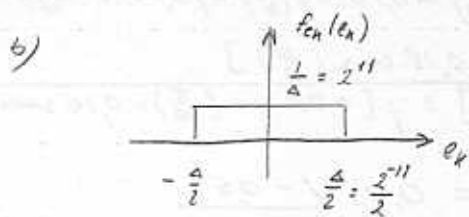
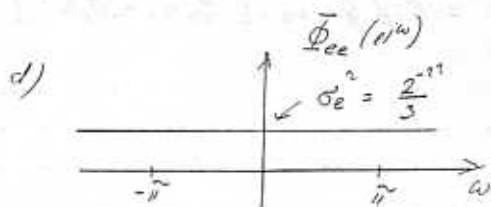


$$H(z) = \frac{0,20 + 0,18z^{-1}}{1 - 0,70z^{-1} + 0,10z^{-2}}$$



c)

$$\sigma_e^2 = 4 \sigma_{e_n}^2 = 4 \frac{2^{-20}}{12} = \frac{2^{-22}}{3}$$



e)

$$P_e = \frac{1}{2\pi} \int_{-\pi}^{\pi} \Phi_{ee}(w) dw = \frac{1}{2\pi} \int_{-\pi}^{\pi} \sigma_e^2 dw = \sigma_e^2 = \frac{2^{-22}}{3}$$

f) Översättningsfunktion från $e[n]$ till $f[n]$ är

$$H_{ef}(z) = \frac{1}{1 - 0,70z^{-1} + 0,10z^{-2}} = \frac{z^2}{z^2 - 0,70z + 0,10} = \frac{z^2}{(z-0,5)(z-0,2)}$$

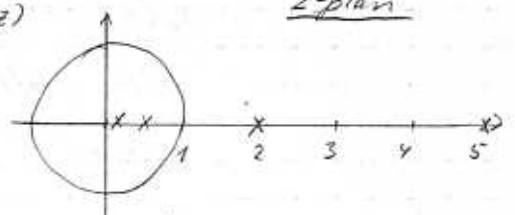
$$H_{ef}(z^{-1}) = \frac{z^{-2}}{(z^{-1}-0,5)(z^{-1}-0,2)} = \frac{1}{(1-0,5z)(1-0,2z)}$$

$$P_f = \sigma_f^2 = \sigma_e^2 \frac{1}{2\pi j} \oint_{|z|=1} H_{ef}(z) H_{ef}(z^{-1}) z^{-1} dz$$

$$= \sigma_e^2 \frac{1}{2\pi j} \oint_{|z|=1} \frac{z}{(z-0,5)(z-0,2)(1-0,5z)(1-0,2z)} dz$$

$$= \sigma_e^2 \left[\frac{z \cdot (z-0,2)}{(z-0,5)(z-0,2)(1-0,5z)(1-0,2z)} \Big|_{z=0,5} + \frac{z \cdot (z-0,2)}{(z-0,5)(z-0,2)(1-0,5z)(1-0,2z)} \Big|_{z=0,2} \right]$$

$$= \frac{2^{-22}}{3} [2,1691 - 0,7716] = \frac{2^{-22}}{3} 1,6975 \approx 0,57 \cdot 2^{-22}$$



idet $\frac{1}{2\pi j} \oint_{|z|=1} I(z) dz = I(z)(z-z_i) \Big|_{z=z_i} + I(z)(z-z_i) \Big|_{z=z_2} + \dots$

for samtliga poler z_i inuti eller utanför cirkeln