

Symbol Recovery Simplified

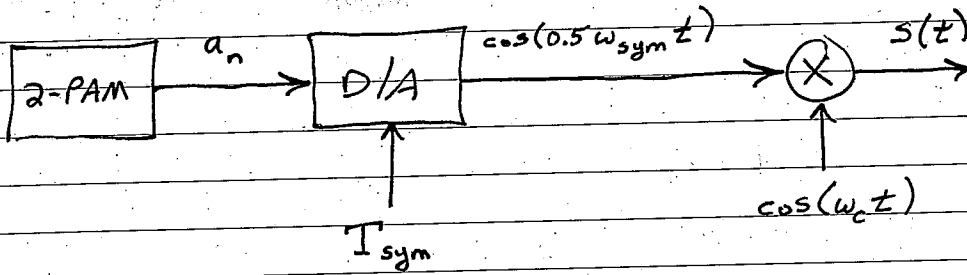
EE345S
Evans



Transmit 2-PAM Symbols

$$a_n = (-1)^n = \cos(n\pi) = \cos(0.5 \omega_{sym} T_{sym} n)$$

Receiver



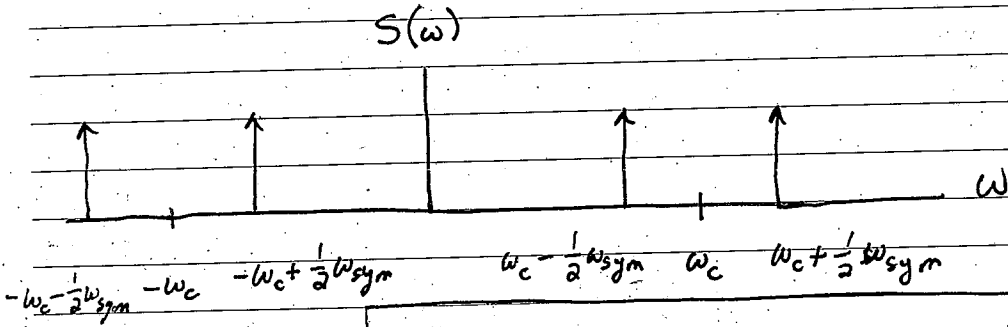
$$f[n] = e^{j\omega_{sym}(nT_{sym} + T)}$$

$$= e^{j(\omega_{sym}T_{sym}n + \omega_{sym}T)}$$

$$= e^{j(2\pi n + \omega_{sym}T)}$$

$$f[n] = e^{j\omega_{sym}T}$$

$$s(t) = \cos(0.5 \omega_{sym} t) \cos(\omega_c t)$$



$$p[n] = \alpha v[n] + \beta y[n]$$

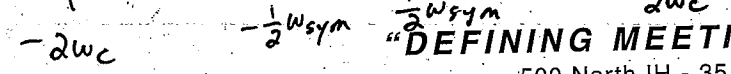
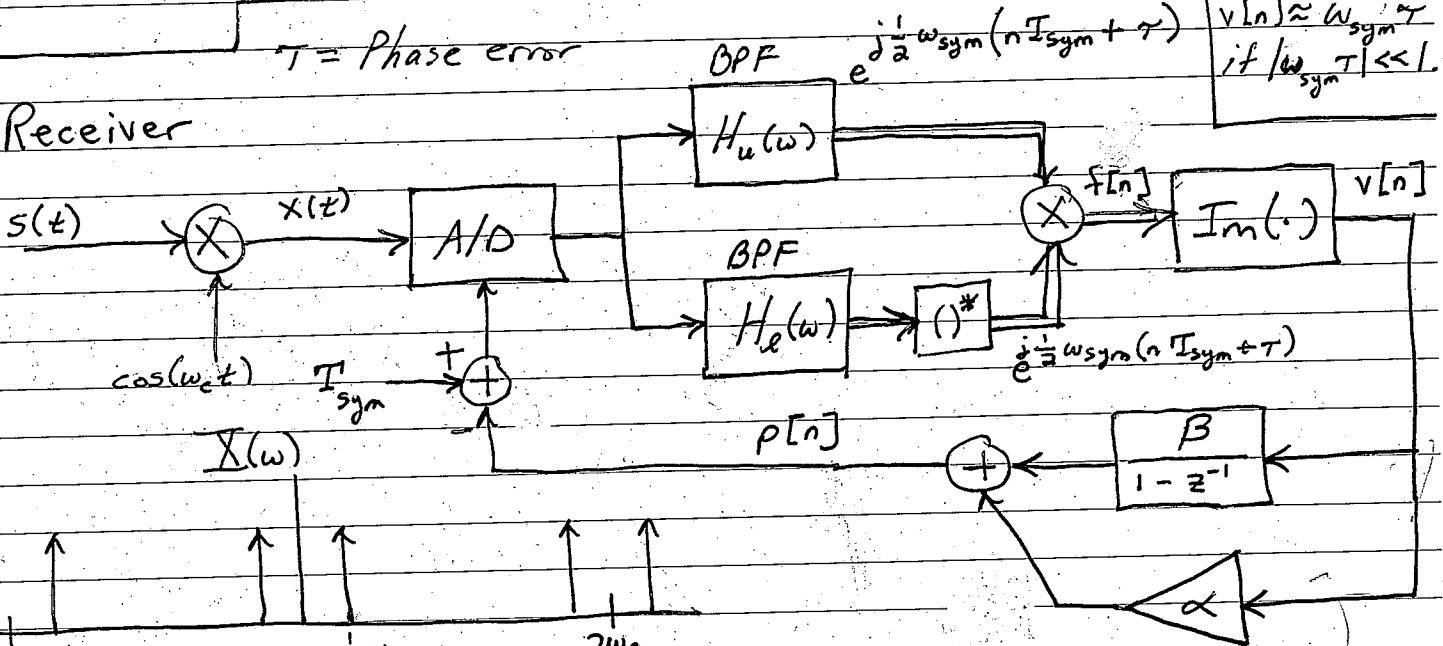
$$\delta[n] = v[n] + \delta[n-1]$$

with $\delta[-1] = 0$.

$$v[n] = \text{Im}(e^{j\omega_{sym}T}) = \sin(\omega_{sym}T)$$

$T = \text{Phase error}$

Receiver



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