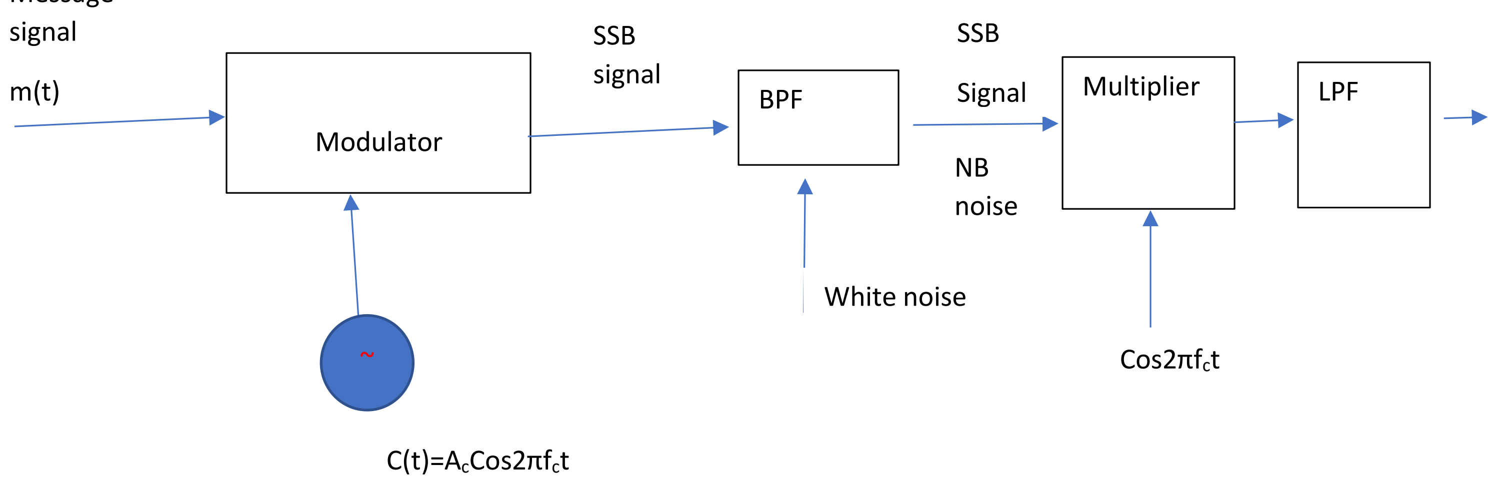
Figure merit of SSB receiver



SSB signal= $S(t) = A_c m(t) Cos 2\pi f_c t \pm A_c \hat{m}(t) Sin 2\pi f_c t$

NB noise= $n(t)=n_c(t)\cos 2\pi f_c t - n_q(t)\sin 2\pi f_c t$

i/p to the multiplier= SSB signal + NB noise

DSB i/p signal power=$A_c^2P/2$ watt

$(S_i)_{DSB}=A_c^2P/2$ watt

$(S_i)_{SSB}=A_c^2P/4$ watt

Input noise power= $N_i=N_oW$ watt

$$\mathbf{S_i/N_i=A_c^2P/4N_oW}$$

i/P signal power=$A_c^2P/4= S_i$

Where P is power of message signal

Input Noise Power= $N_i= N_oW$

$$S_i/N_i = A_c^2 P/4N_oW = (SNR)_{i/p} \qquad (1)$$

$$SSBsignal = \frac{A_c m(t)}{2} Cos\, 2\pi f_c t + \frac{A_c \hat{m}(t)}{2} Sin\, 2\pi f_c t$$

O/P of multiplier=(NB noise+SSB signal)×Cos2πf$_c$t

$$O/p = [\{\frac{A_c m(t)}{2} Cos 2\pi f_c t + \frac{A_c \hat{m}(t)}{2} Sin 2\pi f_c t\} + n_c(t) Cos 2\pi f_c t - n_q(t) Sin 2\pi f_c t] \times Cos 2\pi f_c t$$

$$O/P\ of\ LPF = A_c m(t)/4 + n_c(t)/2$$

Signal Component

Noise Component

$$O/p\ signal\ power = S_0 = A_c^2 P/16$$

$$Output\ Noise\ Power = N_oW/4$$

$$(SNR)_{o/p} = A_c^2 P/4N_oW \qquad (2)$$

Figure of merit in SSB receiver is 1.

$$(FoM)_{SSB} = (SNR)_{o/p}/(SNR)_{i/p} = 1$$

Conclusion

In-phase Component power in SSB receiver is N_oW

In-phase Component power in DSB receiver is $2N_oW$