✱ The message signal $m(t)$ & in-phase noise Component $n_I(t)$ of the filtered noise $n(t)$ appears additively at the receiver output

✱ The Quadrature Component $n_Q(t)$ of the noise $n(t)$ is Completely rejected by the Coherent detector

∴ The Average power y the received message signal, is

$$\Rightarrow \frac{c^2 A_c^2 \cdot P}{2(2)}$$

and noise power is, $\frac{1}{2} W \cdot N_0$

∴ Output SNR of DSB-SC is.,

$$(SNR)_{0, DSB-SC} = \frac{\frac{c^2 A_c^2 P}{4.}}{\frac{W \cdot N_0}{2}}$$

$$= \frac{c^2 A_c^2 P}{4} \times \frac{2}{W \cdot N_0} = \boxed{\frac{c^2 A_c^2 \cdot P}{2 \cdot W \cdot N_0}}$$

MATLAB   clc:

∴ Figure of merit,

$$\frac{(SNR)_0}{(SNR)_c}\Bigg|_{DSB-SC} = 1.$$

$$\frac{c^2 A_c^2 P}{2 A \left(\frac{W \cdot N_0}{2}\right)}$$

$=$

$$\left(\frac{A_c}{\sqrt{2}}\right)^2$$

$$= \frac{A_c^2}{2}$$

$$\Rightarrow \frac{1}{2} \cdot c^2 \cdot \frac{A_c^2}{2} \cdot P$$