

2. Modulation index for AM wave

$$m_a = \frac{E_m}{E_c} = \frac{E_{\max} - E_c}{E_c} = \frac{E_c - E_{\min}}{E_c}$$
$$= \frac{E_{\max} - E_{\min}}{E_{\max} + E_{\min}} = \frac{E_{\max} - E_{\min}}{2E_c}$$

If several modulating signals are present then

$$m_{\text{act}} = \sqrt{m_1^2 + m_2^2 + m_3^2 \dots} \quad m_{\text{act}} \leq 1.$$

3. Total Power in AM Wave

$$P_{\text{Total}} = P_{\text{Carrier}} \left[1 + \frac{m_a^2}{2} \right]; \quad \frac{I_{\text{Total}}}{I_{\text{Carrier}}} = \sqrt{1 + \frac{m_a^2}{2}}$$