

3.6.3 Bandwidth of an FM Signal

The bandwidth of an FM signal could be calculated as:

$$B_{FM} = 2nB_m$$

where n = maximum number of *significant* sidebands,

B_m = the bandwidth of the baseband signal.

3.6.4 Power in FM

For sinusoidal input signal, the FM formula is $y(t) = A_c \cos(\omega_c t + \beta \sin(\omega_m t))$

Mean square power of each sideband of an FM signal: $P_n = \frac{A_c^2}{2R} J_n^2(\beta)$

Mean square power of an **unmodulated** FM carrier is: $P_c = \frac{A_c^2}{2R} = P_{Total}$

Mean square power of total FM signal power is that delivered to the load:

$$P_L = \sum_n P_n = P_c \left\{ J_0^2 + 2(J_1^2 + J_2^2 + J_3^2 + J_4^2 + \dots) \right\}$$

when $n \rightarrow \infty$ (i.e. All sidebands are included), $P_L \approx P_c \equiv P_{Total}$

Solve Examples