Angle Modulation

Phase Modulation

Angle of the carrier wave $c(t)$ is modified by the message signal $m(t)$.

$$x_{Ang}(t) = A_c \cos[2\pi f_c t + \varphi(t)]$$

Instantaneous phase: $\varphi_i(t) = 2\pi f_c t + \varphi(t)$

Instantaneous angular frequency: $\omega_i(t) = \frac{d\varphi_i(t)}{dt} = 2\pi f_c + \frac{d\varphi(t)}{dt}$

Carrier's phase $\varphi(t)$ is varied with message signal.

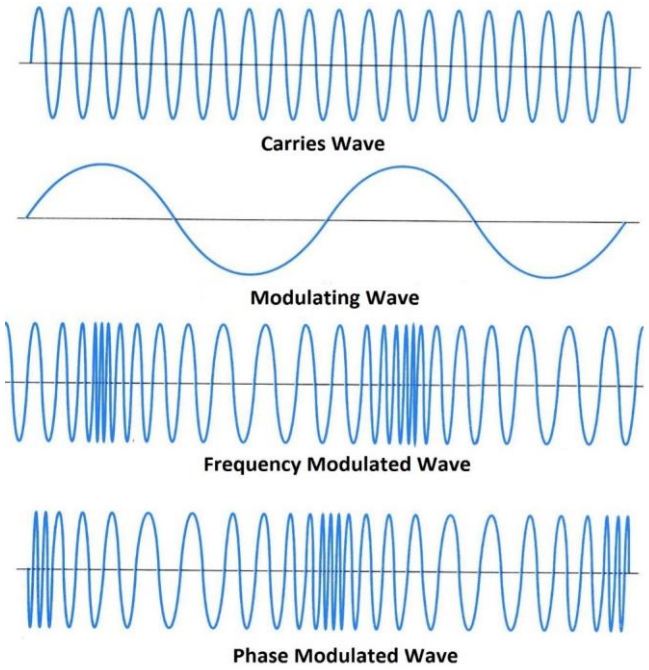
$x_{PM}(t) = A_c \cos[2\pi f_c t + k_p m(t)]$

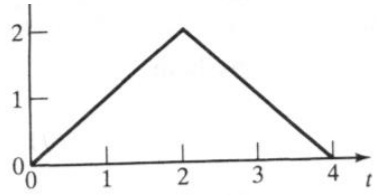
Input signal is accepted as 'phase' in PM.

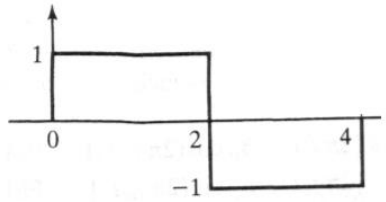
k_p - phase sensitivity, units are radians/unit of $m(t)$

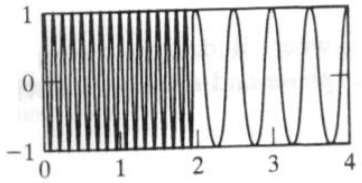
$$\omega_i(t) = \frac{d\varphi_i(t)}{dt} = 2\pi f_c + \frac{d\varphi(t)}{dt} = 2\pi f_c + k_p \frac{d}{dt} m(t)$$

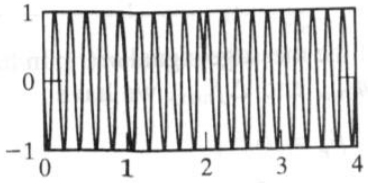
Instantaneous frequency varies linearly with $\frac{d}{dt} m(t)$











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