

Amplitude Modulation $x(t) = a(t) \cos(2\pi f_c t)$

Sinusoidal AM $a(t) = 2A \cos(2\pi f_a t)$

$$x(t) = A \cos(2\pi(f_c + f_a)t) + A \cos(2\pi(f_c - f_a)t)$$

Frequency Modulation

$$x(t) = A \cos(\psi(t))$$

Instantaneous Frequency (Hz)

$$f_i(t) = \frac{1}{2\pi} \frac{d}{dt} \psi(t)$$

Chirp - linear frequency sweep

$$\psi(t) = 2\pi\mu t^2 + 2\pi f_0 t + \phi$$

$$f_i(t) = 2\mu t + f_0$$