

## 1 Formulas

- **Signal to Noise Ratio:**  $SNR = 10\log_{10}\frac{P_s}{P_n}$
- **Shannon's Equation:**  $C = B_c\log_2(1 + SNR)$
- **antennasize**  $= \frac{1}{4}wavelength$
- **Energy of Signals:**  $E = \int_{-\infty}^{\infty} |x(t)|^2 dt$
- **Parseval's Theorem:**  $\int_{-\infty}^{\infty} |x(t)|^2 dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} |X(\omega)|^2 d\omega$
- **Coherent Demodulator:**  $m(t)\cos(\Delta\omega t + \theta_d)$
- **Modulation Index(AM):**  $\mu = \frac{m_{max}-m_{min}}{2A+m_{max}+m_{min}}$
- **Time Constant of Envelope Dector:**  $\frac{1}{\omega_c} < \tau < \frac{1}{2\pi B}$
- **Modulation Index(Angle Modulation):**  $\beta = \frac{\Delta f}{B}$
- **Maximum Phase Deviation:**  $\frac{Max(a)-Min(a)}{2}$
- **Maximum Frequency Deviation:**  $\frac{Max(a')-Min(a')}{2}$

## 2 Concepts

### 2.1 Bandwidth

- **SSB:**  $B$
- **VSF:**  $B_{..} < 2B$
- **DSB:**  $2B$
- **Narrow Band**( $\beta < 0.2$ ):  $2B$
- **Angle Modulation(Effective Bandwidth):**  $2(B + \Delta f) = 2B(1 + \beta)$

## 3 Taolu