九十二年度中央大學通訊系在職專班

Principles of communication Systems

1. A system with Amplitude response and phase shift as shown in Fig1. Find the output signal if input signals is $\cos 10\pi t + \cos 26\pi t + \cos 32\pi t$ (15%)

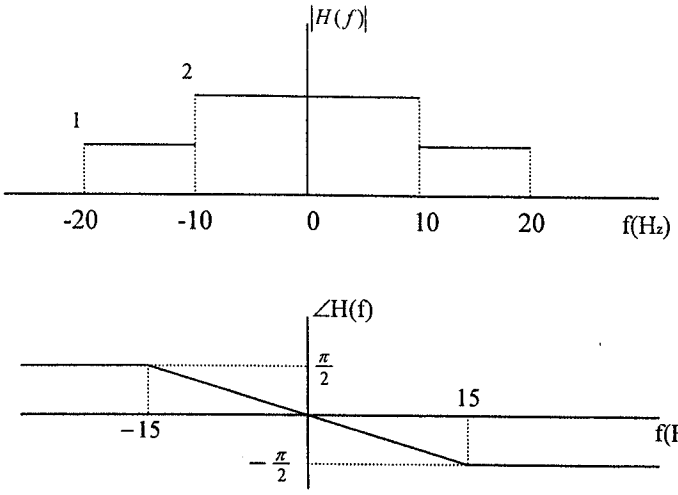

Fig 1

2. Consider a channel for which the following sample values of channel pulse response are given

   $P_C(-2\Gamma) = -0.05$ $P_C(-\Gamma) = 0.2$ $P_C(0) = 1.0$

   $P_C(\Gamma) = 0.3$ $P_C(2\Gamma) = -0.07$

   Find the zero-forcing tap coefficients (15%)

3. An MSK system has a carrier frequency of $10MHz$ and transmit data at a rate of $10Kbps$ (15%)

   (A) For the data sequence 101010... what is the instantaneous frequence?

   (B) For the data sequence 000000... what is the instantaneous frequence?

   (C) For the data sequence 111111... what is the instantaneous frequence?

4. For a Binary source, the probability of sending Binary one is $P(1) = \alpha$ and Binary zero $P(0) = 1 - \alpha$ (15%)

   (A) Find the entropy of source $H(\alpha)$ as function of α

   (B) Find the minimus and maximum of entropy and corresponding α values

5. An systematic Block code has the parity check matrix $[H] = \begin{bmatrix} 1101100 \\ 1110010 \\ 0111001 \end{bmatrix}$ (15%)

   (A) Determine the Generator matrix

   (B) If information sequence is $[A] = \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \end{bmatrix}$ find the encoded code word

   (C) If the received sequence is 0110101 is it a code word ? If not a code word give the correct code sequence

6. Describe the following definition or theorem (25%)

   (A) Sampling Theorem

   (B) Carson 's Rule

   (C) Shannon-Hartley Theorem

   (D) Delta Modulation

   (E) Granular Noise