

93 年度中央大學通訊工程學系碩士在職專班 【02】「通訊系統」考題

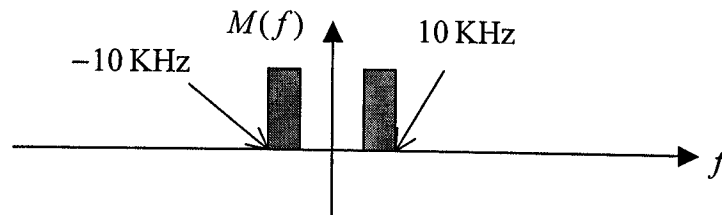
考試日期：中華民國 93 年 3 月 13 日星期六，上午 10:30~12:10

考試地點：中央大學電機館一樓 E1-120 教室

考試時間：100 分鐘

試題總分：100 分

- Plot the block diagram of a superheterodyne receiver; (10%)
 - Plot the block diagram of a digital communication system. (10%)
- For an audio signal $m(t)$ with a power spectrum shown below to be transmitted,
 - express the amplitude-modulated signal $s(t)$ when the carrier frequency is 1 MHz; (6%)
 - plot the spectrum of the amplitude-modulated signal $s(t)$; (7%)
 - express a demodulation method to derive $m(t)$ from $s(t)$. (7%)



- For a signal $m(t) = \cos(2000\pi t)$ to be transmitted in a Frequency Modulation (FM) system,
 - express the FM signal $s(t)$ with a maximum frequency deviation of 5000 Hz and a carrier frequency of 1 MHz; (8%)
 - plot the spectrum of the FM signal $s(t)$. (7%)
- For a BPSK (Binary Phase Shift Keying) digital communication system,
 - plot the transmitted waveform if the transmitted data is [1 0 1 1 0], the symbol rate is 1 K symbols/sec, and the carrier frequency is 4 KHz; (6%)
 - plot the spectrum of the BPSK signal when the data is assumed to be identical independent distribution with probability(data=0)=probability(data=1)=0.5; (7%)
 - when the receiver of the BPSK system has a detection error probability of $p_e = 0.1$ for each received symbol, find the probability of the event that there are more than one error (i.e., 2 or 3 errors) occurred in three consecutive(連續) received symbols. (7%)
- For a linear time invariant system with an impulse response of $h(t)$,
 - express the output of the system in time domain when the input is $s(t)$; (5%)
 - express the output of the system in frequency domain when the input has a spectrum of $S(f)$. (5%)
- Explain the following terms: (a) Frequency Division Multiplexing; (b) Sampling Theorem; (c) Channel Equalization. (15%)