Examination Feedback for EEE201 – Signals and Systems
Autumn Semester 2010-11

Feedback for EEE201 Session: 2010-2011

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

Most students did reasonably well in Q2 and Q3. A lot of students struggled with Q1(d) and Q4(b). More specific comments are given below.

Question 1:

Part (a) is relatively easy. Most of you are able to carry out the graphical convolution correctly in part (b). In part (c), you should have realized that the unit step response can be obtained by convolution i.e $\int_{-\infty}^{\infty} h(\tau)u(t-\tau)d\tau$. Instead some of you attempted to solve this using Laplace Transform, which is possible but involves more steps (hence increasing the possibility of making mistakes). Note that only 3 marks are allocated for part (c) indicating that it should only involve a few steps. I am surprised that a number of students struggled to sketch r(t) correctly. Noting that the sequence “0 1” is represented by –m(t) and m(t-1), you should be able to sketch the final response by adding –r(t) and r(t-1). From your sketch you should be able to see that the max. value for the bit “1” is only 0.033, making it extremely difficult to recover the signal in the presence of noise in a practical system.

Question 2:

Most students did well in this question. Part (a) is relatively straight forward especially since you should be able to recognize that the coefficient a_n is given by $\frac{1}{n\pi}\left(2\sin\left(\frac{n\pi}{2}\right)\right)$ in part (b). A number of students wrote y(t)=v(t).H(ω) which is wrong as v(t) is a time domain signal while H(ω) is a frequency domain transfer function. It should be pointed out that the amplitude of the nth harmonic is being modified by the $|H(n\omega_o)|$ where ω_o is the fundamental frequency. Finally in part (c) you should be able to calculate the complex Fourier Series coefficients within the frequency range to obtain the average power using Parseval’s theorem.

Question 3:

Most of you have no problem with parts (a) and (b). In part (c) you were expected to construct the relationships between the signals given. For instance by inspection, Y(s)=F(s).E(s), R(s)=G(s).Y(s) and E(s)=X(s)+R(s). A number of students wrote y(t)=F(s).e(t) etc… which are wrong since you should not be multiplying the signal in the s domain with a time domain signal. I was surprised to see some students compared $s^2LC+sRC+1$ with $s^2+2\zeta\omega_n s+\omega_n^2$. They then wrote $\omega_n^2 = LC$, which is clearly wrong.

Question 4:

A few students have not read the questions carefully. They tried to show that $W(\omega)=\tau\frac{\sin(\omega\tau/2)}{(\omega\tau/2)}$ which was not required. In this part the linearity, time shift and integration properties should be used as stated in the questions. You should be able to obtain most of the 10 marks allocated. Most of you have no problem with part b(i) but very few answered b(ii) correctly. You should note that the average power of $c(t)=A_c\cos(\omega_c t)$ is $A_c^2/2$ (see tutorial 1). Similarly you can easily work out the average power in the sidebands. There is no need to use Parseval’s theorem or carry out lengthy integration.