

**NOTE: Mid term is on Friday, November 12, 2004 at 8:30 am (in class). It is closed book and closed notes. Table 11.2 and 11.3 will be given to you. TOPICS: Chapter 11 and Sampling**

**1. Sampling**

$$(X_d[n]=x(t)|_{t=nT})$$

- Relationship between  $X(j\omega)$  and  $X_d(e^{j\omega})$
- The Nyquist sampling theorem
- Aliasing and how to find aliased frequencies
- Reconstruction of  $x(t)$  from its samples

**2. Discrete-Time Systems (Chapter 11)**

- Definition and properties of 1-sided and 2-sided
- Z-transforms, and ability to compute the Z-transform of time sequences  $x[n]$ .
- Computation of inverse Z-transforms using partial fraction expansion and tables.
- Use of Z-transform to solve ordinary difference equations with initial conditions.
- Identifying the zero-state and zero-input components of a system response.
- Obtaining the transfer function  $H(z)$  from the ODE and conversely.
- Stability tests. (stable; marginally stable; unstable)
- How pole locations affect forms of system responses.
- Steady-state responses of stable systems to step and sinusoidal inputs.
- Frequency response  $H(e^{j\Omega})$  and its relationship to the transfer function  $H(z)$ .
- Graphical interpretation of frequency response.
- Graphical interpretation of the effects of frequency response on poles and zeroes of a system.