



# COLLEGE OF ENGINEERING & TECHNOLOGY

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**Course** : Spectral Analysis  
**Course Code** : EC321

## Sheet 8

1. For the following pulse:

$$g(t) = e^{-at} [u(t) - u(t-T)]$$

where  $u(t)$  is the step function

Find:

- The autocorrelation function, ESD, and energy content.
  - When  $g(t)$  is repeated periodically every  $2T$  sec, find the average power of  $g_p(t)$ .
2. Find the autocorrelation function of the given signals and sketch it.
- $g(t) = A \text{rect}(\frac{t}{T})$
  - $g(t) = e^{-at} u(t)$
3. Evaluate the following Integrations.

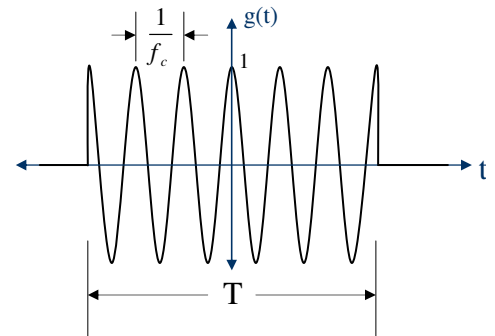
a.  $\int_{-\infty}^{\infty} 4 \text{sinc}^4(2t) dt$

b.  $\int_{-\infty}^{\infty} 4 \cos^2(2\pi 100t) \text{sinc}^2(4t) dt$

4. Find the energy content in the shown RF pulse using:

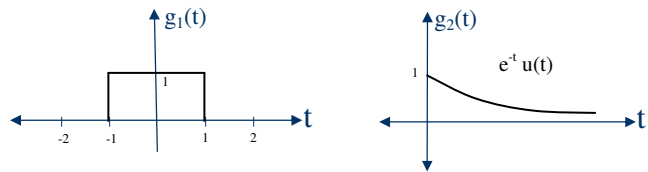
- Time domain.
- Frequency Domain.

Then find the ESD and autocorrelation.



5. Find the following.

- Cross correlation  $R_{12}(\tau)$
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- Energy spectral density  $\Psi_{12}(f)$
- Energy spectral density  $\Psi_{21}(f)$



6. Find the Cross correlation function.

