淡江大學97學年度碩士班招生考試試題

系別：電機工程學系　　科目：通　信　系　統

通信系統組

准帶項目請打「V」	
	簡單型計算機

本試題共 1 頁，5 大題

I. [20] Derive the Fourier transform of the signal $x(t) = e^{-\alpha|t|}$, $\alpha > 0$.

II. [20] The signal of problem I is passed through a linear time-invariant system with impulse response $h(t) = u(t)$, where $u(t)$ is the unit step function. Determine the system output.

III. [20] Consider random process given as $x(t) = \cos(t + \theta)$, where θ is a random variable with probability function given by

$$f(\theta) = \begin{cases} 1/2\pi, & 0 < \theta < 2\pi \\ 0, & \text{elsewhere} \end{cases}$$

Find the mean $E[x(t)]$.

IV. [20] For the random process in III, find the autocorrelation function $E[x(t)x(t+\tau)]$.

V. [20] Is the process in III stationary in the wide sense?