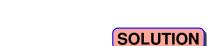
as $\Re e\{a\} > 0$.

EXERCISE 11.1: Confirm that (11.16) is a valid Fourier transform pair even when a is a complex number, as long



McClellan, Schafer and Yoder, Signal Processing First, ISBN 0-13-065562-7. Prentice Hall, Upper Saddle River, NJ 07458. © 2003 Pearson Education, Inc.



$$x(t) = e^{-at}u(t)$$
 F.T. $X(j\omega) = \frac{1}{a+j\omega}$

Let a= a+jB where a= Rejaj.

In order to have a Fourier transform the signal must be absolutely integrable, i.e., $\int_{-\infty}^{\infty} |x(t)| dt < \infty$

If we apply this test:

$$\int_{-\infty}^{\infty} |x(t)| dt = \int_{-\infty}^{\infty} |e^{-at}u(t)| dt = e^{at} = e^{(at)\beta}$$

$$= \int_{-\infty}^{\infty} |e^{-at}e^{-j\beta t}| dt$$

We need lime at to be finite. If a>0, the limit is zero.