Example 9-16: Stable System

Consider the LTI system whose impulse response is a square pulse of the form

$$h(t) = u(t + 10) - u(t - 10) = \begin{cases} 1 & -10 \leq t < 10 \\ 0 & \text{otherwise} \end{cases}$$

To test to see if this system is stable, we simply substitute into (9.66) and check to see if the result is finite. That is

$$\int\limits_{-\infty}^{\infty} |h(\tau)| d\tau = \int\limits_{-10}^{10} d\tau = 20 < \infty$$

Therefore this system is stable.