Friday, 30 October 2020 12:14

$$y(t) = \int_{-\infty}^{\infty} x(t-s)\ \frac{1}{1+s^2}\ ds$$

$$y(t) = h(t) \not* x(t)$$

$$y(t) = \int_{-\infty}^{\infty} x(t-s)\ \frac{1}{1+s^2}\ ds$$

$$Y(f) = |H(f)|^2 \cdot X(f).$$

$$Y(f) = F(y(t)) = \int_{-\infty}^{\infty} y(t)\ e^{-j\omega t}\ dt$$

$$X(f) = F(x(t)) = \int_{-\infty}^{\infty} x(t)\ e^{j\omega t}\ dt$$

$$H(f) = F(h(t)) = \int_{-\infty}^{\infty} \frac{1}{1+s^2}\ e^{-j\omega t}\ dt$$

$$H(f) = \sqrt{\frac{\pi}{2}}\ e^{-|\omega|}$$