Unit 3 Lesson 6

- We define the convolution product of two functions as

$$(f * g)(t) = \int_{0^-}^{t^+} f(s)\, g(t-s)\, ds$$

- For any linear time invariant system, we have that, given unit impulse response $w(t)$ for the DE

$$P(D)\, y = f(t),$$

Green's Formula states

$$y(t) = (f * w)(t) = \int_{0^-}^{t^+} f(s)\, w(t-s)\, ds.$$

- The unit impulse response function $w(t)$, also known as the weight function, is the solution to

$$P(D)y = \delta(t) \text{ with rest IC}$$

Practice Problems

1: $(t * 1)(x) = \int_{0^-}^{x^+} (x - s)\, ds = \frac{x^2}{2}$