$$\frac{y_i - y_{i-1}}{dt} = (1/\tau) * (x_i - y_i)$$

$$y_i - y_{i-1} = (dt/\tau) * (x_i - y_i)$$

$$y_i + (dt/\tau)y_i = (dt/\tau)x_i + y_{i-1}$$

$$(1 + \frac{dt}{\tau})y_i = \frac{dt}{\tau}x_i + y_{i-1}$$

$$\frac{\tau + dt}{\tau}y_i = \frac{dt}{\tau}x_i + y_{i-1}$$

$$y_i = \frac{dt}{\tau + dt} * x_i + \frac{\tau}{\tau + dt} * y_{i-1}$$

$$\alpha = \frac{dt}{\tau + dt}; 1 - \alpha = \frac{\tau}{\tau + dt}$$

$$y_i = \alpha * x_i + (1 - \alpha) * y_{i-1}$$