2.8. Determine and sketch the convolution of the following two signals:

$$x(t) = \begin{cases} t+1, & 0 \le t \le 1 \\ 2-t, & 1 < t \le 2 \\ 0, & \text{elsewhere} \end{cases} \qquad h(t) = \delta(t+2) + 2\delta(t+1)$$

$$x(t) * h(t) = y(t) = x(t) * (\delta(t+2) + 2\delta(t+1)) = x(t+2) + 2x(t+1) =$$

$$= \begin{cases} t+3, & 0 \le t+2 \le 1 \Leftrightarrow -2 \le t \le -1 \\ -t, & 1 < t+2 \le 2 \Leftrightarrow -1 < t \le 0 \\ 0, & \text{elsewhere} \end{cases} + 2 \cdot \begin{cases} t+2, & 0 \le t+1 \le 1 \Leftrightarrow -1 \le t \le 0 \\ 1-t, & 1 < t+1 \le 2 \Leftrightarrow 0 < t \le +1 \\ 0, & \text{elsewhere} \end{cases} =$$

$$= \begin{cases} t+3, & -2 \le t \le -1 \\ t+4, & -1 \le t \le 0 \\ 2-t, & 0 < t \le +1 \\ 0, & \text{elsewhere} \end{cases}$$