Problem S2 (Signals and Systems)

A system has step response given by

$$g_s(t) = \begin{cases} 0, & t < 0 \\ e^{-t} + e^{-3t}, & t \geq 0 \end{cases}$$

Find and plot the response of the system to the input

$$u(t) = \begin{cases} 0, & t < 0 \\ 1 - e^{-2t}, & t \geq 0 \end{cases}$$

using Duhamel's integral.