Tune-Up Tuesday #8 Continuous-Time Convolution

Homework problem 7.4(a)iv.  Convolve *x*(*t*) and *h*(*t*) where

* *x*(*t*) is a rectangular pulse that lasts from 0 seconds to 9 seconds
* *h*(*t*) is a rectangular pulse that lasts from 0 seconds to 4 seconds

Perform the convolution in continuous time using cconvdemo from *Signal Processing First*.

Install the code from https://dspfirst.gatech.edu/matlab/ZipFiles/cconvdemo-v218.zip . Please copy and paste the link into your browser, and unzip the contents in your local Matlab directory. Change directories to cconvdemo and run the command cconvdemo.

Describe the output *y*(*t*).

***Answer:*** Trapezoid of duration seconds. Let seconds and seconds. As we flip and slide one rectangular pulse against the other, partial overlap occurs from 0 to seconds, complete overlap from to seconds, and partial overlap from to seconds.

We can check the points at the boundaries between intervals for a sanity check. For example, when t = 4, partial overlap gives an amplitude of 4 and so does complete overlap.

Graphical user interface

Description automatically generated