EXAMPLE REPORT

ECGR 4123 Computer Project 1

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PART 1: Plotting Simple Functions ==========

omega = 15.7080

g(t) = e^{-t}

x(t) = $\sin(5\pi t)$

h(t) = $e^{-t}\sin(5\pi t)$

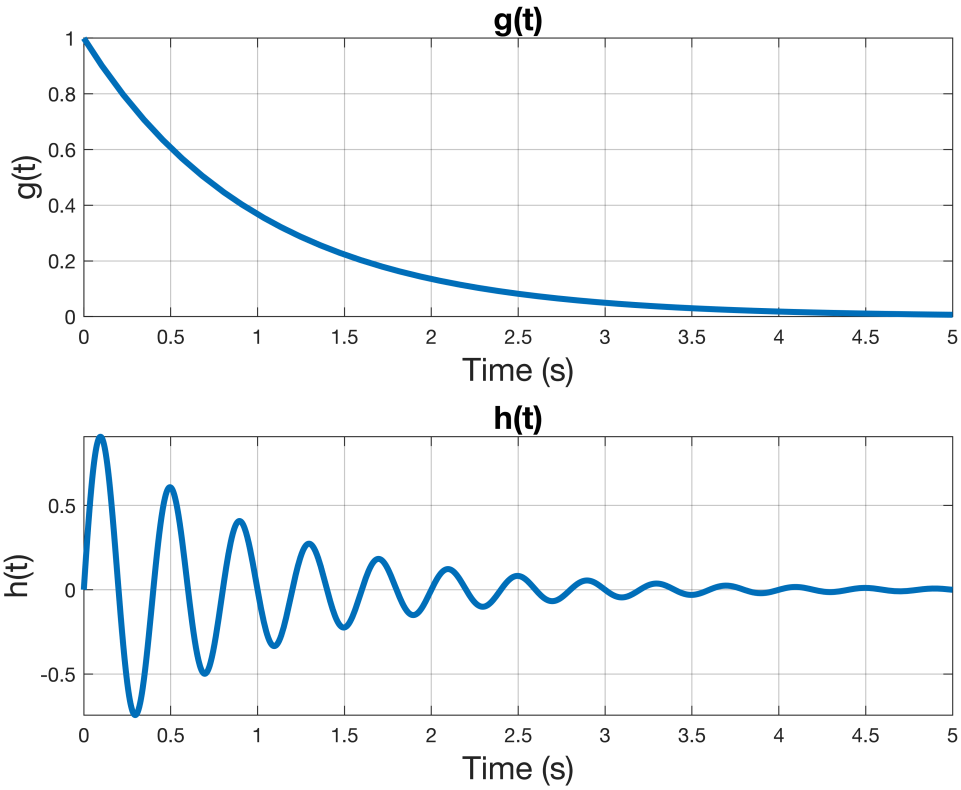

Fig. 1. Time functions.

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Q1. Change the formula to omega=10 pi, and observe the newplot

for h(t) in Figure 1, and include it in your report

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Q2. For the new omega of Q1, what is the corresponding frequency in Hz?

Answer: type your answer here

PART 2: Symbolic derivative and integral ==========

== symbolic integral

f(t) = t^2

inttf(t) =

$$\frac{t^3}{3}$$

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Q3. Change the above example to find the integral of t^3 instead of t^2.

== symbolic derivative

f(t) = t^2

ddtf(t) = $2\,t$

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Q4. Change the above example to find the derivative of t^3 instead of t^2.

PART 3: Vectors and Matrices =========================

== symbolic integral

```
colVector = 2×1
     1
     2

vectorTranspose = 1×2
     1     2

matrix = 2×2
     1     2
     4     3

elementINrow2Col1 = 4

matrixTIMESvector = 2×1
     5
    10

matrixINVERSE = 2×2
   -0.6000    0.4000
    0.8000   -0.2000

matrixDETERMINANT = -5

matrix2 = 3×3
   101   102   103
   201   202   203
   301   302   303

vectorTransposeTIMEScolVector = 5
```

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Q5. Above, does vectorTranspose * colVector compute the dot product?

Answer: yes/no

PART 5: Special Functions ================================

Many functions must be constructed from other functions.

Create a triangular function, using the Heaviside function.

Beware: default Heaviside function is not the same as unit step

        default Heaviside(0)=1/2, but we can override it as below

defaultHeaaviside0 = 1

newHeaaviside0 = 1

u(t) = $\mathrm{heaviside}(t)$

pulse(t) =

$$\mathrm{heaviside}\left(t+\frac{1}{2}\right)-\mathrm{heaviside}\left(t-\frac{1}{2}\right)$$

triangle(t) =

$$-\left(\mathrm{heaviside}\left(t-\frac{1}{2}\right)-\mathrm{heaviside}\left(t+\frac{1}{2}\right)\right)\ (2\,t-4\,t\,\mathrm{heaviside}(t)+1)$$

halftri(t) = 0

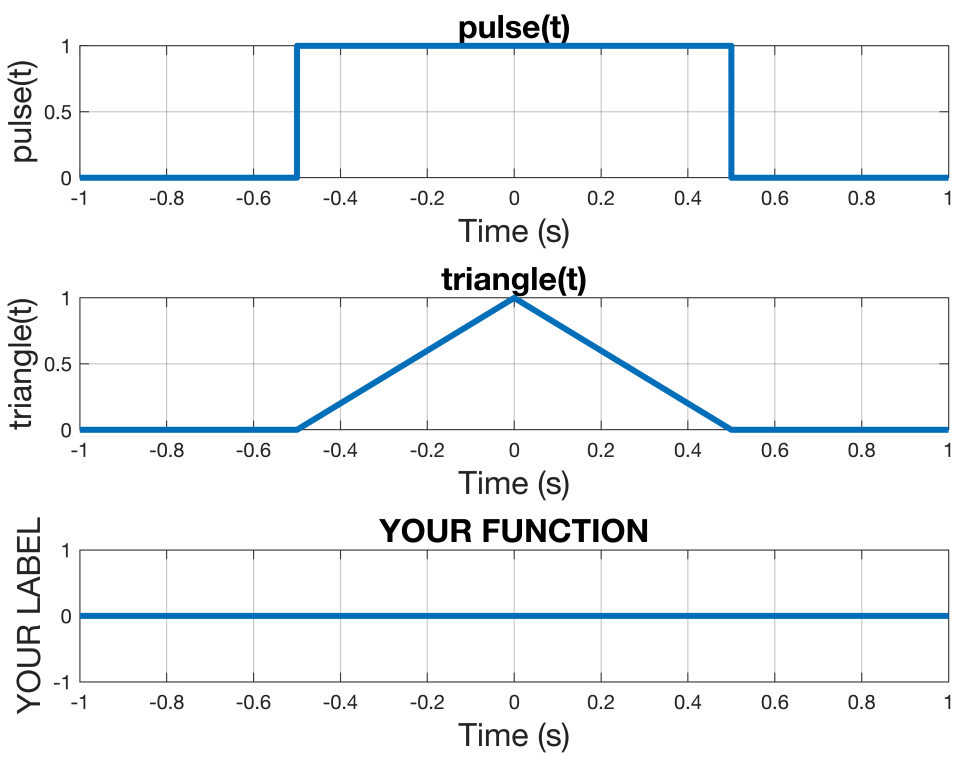

Fig. 1. Pulse and triangle functions.

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Q6. Create a new function halftri(t) that is half as wide as triangle(t),

with height 1, and plot it as the third subplot in Figure 2.

(Replacing the duplicate tringle plot in Figure 2)

Also make sure to change the title and axis label to halftri(t).

PART 6: 3D Plots ==========

Here is a rotatable 3D plot example.

Drag the mouse to rotate the figure

Beware: default Heaviside function is not the same as unit step

default Heaviside(0)=1/2, but we can override it as below

```
hh =
  Figure (3) with properties:

      Number: 3
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [360 278 560 420]
       Units: 'pixels'

  Show all properties
```

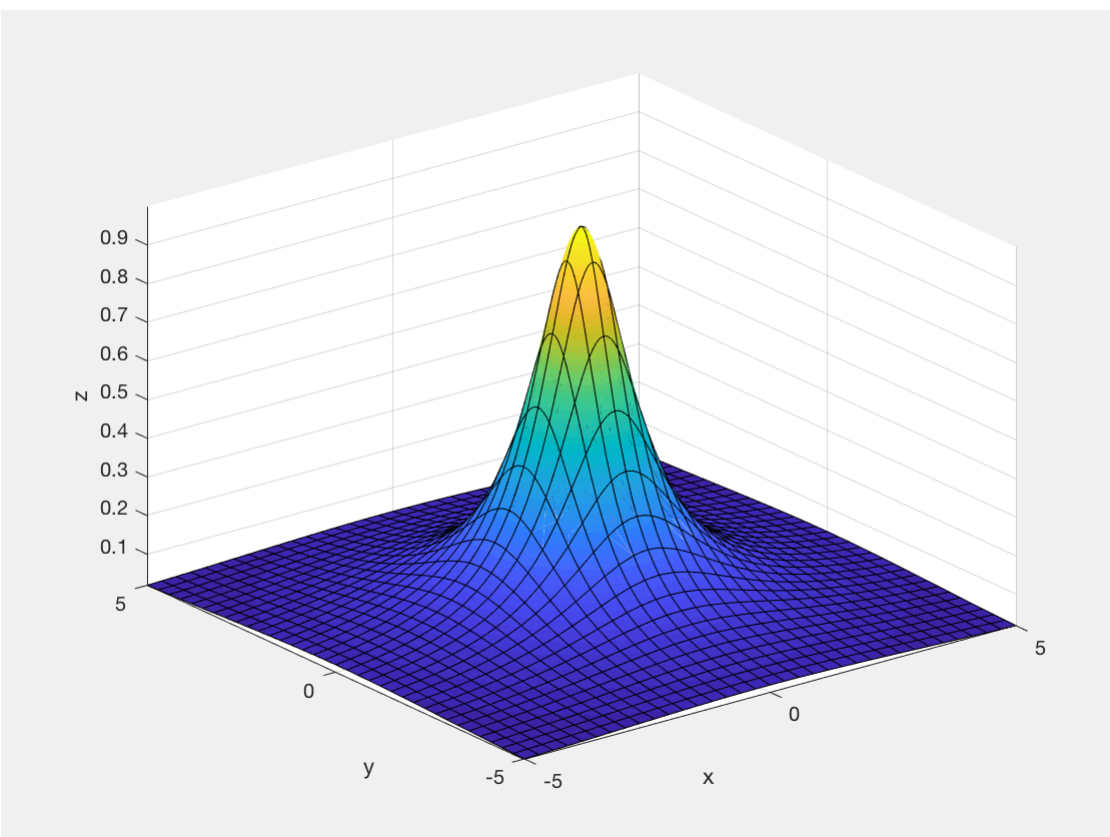

Fig. 2. 3D plot.

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Q7. Change the 3D plot to plot z(x,y)=1/(1+x^2+8*y^2),

and turn in this new plot.

(Replacing the duplicate tringle plot in Figure 2)

Also make sure to change the title and axis label to halftri(t).

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Q8. In what year did KCBS(AM) original licensee, Charles Herrold,

begin radio broadcasting experimentally?

Answer:

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Q9. In what year was the first transistor radio (Regency TR-1) on sale?

Answer:

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Q10. In what year was the Motorola Dynatac first manufactured?

Answer: