

Worksheet completed with Octave.

Question 1

1. Enter your equations and make them left-aligned

$$f(x) = x^2 \quad (1)$$

$$g(x) = \frac{1}{x} \quad (2)$$

$$F(x) = \int_b^a \frac{1}{3}x^3 \quad (3)$$

2. Adding figures is easy!



Figure 1: A goose.

3. To add Matlab code, upload your file and include it here:

Listing 1: My Matlab script!

```
1 % hammer collision with a mass-spring system
2 %%%%%% begin global parameters
```

```
3 SR = 44100; % sample rate (Hz)
4 xH0 = -0.001; vH0 = 2; % initial conditions of hammer
5 TF = 0.05; % duration of simulation (s)
6 w0 = 2000; % angular frequency of mass-spring system
7 MR = 10; % hammer/target mass ratio
8 wH = 1000; % stiffness parameter for hammer
9 alpha = 2; % hammer stiffness nonlinearity exponent
10 %%%% end global parameters
11 % derived parameters
12 k = 1/SR;
13 NF = floor(TF*SR);
14
15 % initialization
16 uH2 = xH0; uH1 = xH0+k*vH0; % hammer
17 u2 = 0; u1 = 0; % mass-spring system
18 out = zeros(NF,1); f = zeros(NF,1);
19 out(1) = u2; out(2) = u1;
20 %%%% start main loop
21 for n=3:NF
22     if(uH1>u1)
23         f(n-1) = wH^(1+alpha)*(uH1-u1)^alpha;
24     else f(n-1) = 0;
25     end
26     uH = 2*uH1-uH2-k^2*f(n-1);
27     u = 2*u1-u2-w0^2*k^2*u1+MR*k^2*f(n-1);
28     out(n) = u;
29     u2 = u1; u1 = u;
30     uH2 = uH1; uH1 = uH;
31     end
32 %%%% end main loop
33 % plots of displacement of target mass and force
34 subplot(2,1,1)
35 plot([0:NF-1]*k, out, 'k'); title('Position of Target Mass'); xlabel
    ('t');
36 axis tight
37 subplot(2,1,2)
38 plot([0:NF-1]
```

4. A console output:

Use a Verbatim section to show console output.
All tabs and spaces are shown exactly the way you enter
them with monospaced font!

Question 2

1. Equations from parts 1 and 2

(a) Write the equation of the surface in the form $z = f(x, y)$.

$$f(x) = (x + a)(x + b) \quad (1)$$

$$L' = L\sqrt{1 - \frac{v^2}{c^2}} \quad (2)$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{2x} \quad (3)$$

$$\frac{\frac{0}{0}}{H} \quad (4)$$

$$\lim_{x \rightarrow 0} \frac{e^x}{2} = \frac{1}{2} \quad (5)$$

(b) Make inline math with dollar dollar y'all *woo!* Also centered equations. Tell LaTeX where you want to align equations with $\&$.

$$f(x) = x^2$$

$$g(x) = \frac{1}{x}$$

$$F(x) = \int_b^a \frac{1}{3}x^3$$

2. Plots for Part 3

(a) Good times.



Figure 2: A meme.