

M 408Q MATLAB EXTRA CREDIT

Problem 1. Consider the functions f and g defined by $f(t) = 2\cos(t)$ and $g(t) = \sin(3t)$.

- (a) Graph the functions f and g on the same set of axes with domain $[-\pi, 5\pi/2]$.
- (b) Display the graph of f as a solid blue curve, and the graph of g as a dashed black curve.
- (c) Make the thickness of both curves 2pt.
- (d) Set the bounds on the vertical axis to be -3 and 3 .
- (e) Label the horizontal axis with “time” and the vertical axis with “position.”
- (f) Include a title for your plot (make up a fun one).
- (g) Make a legend that clearly describes each curve.
- (h) Make the font of the legend 14pt.

Include an image of the figure you have produced reflecting all of the above items.

Problem 2. Consider the function h defined by

$$h(x) = \begin{cases} 2x & 0 \leq x < 1 \\ 2x^2 & 1 \leq x \leq 2 \\ 1 & x > 2 \end{cases}.$$

- (a) Graph the function h on the domain $[0, 4]$.
- (b) Set the bounds on the vertical axis to be 0 and 10.
- (c) Use the `scatter` command to mark the point $(2, 1)$ with an open circle and the point $(2, 8)$ with a solid (filled-in) circle.
- (d) Label each piece of your graph using an arrow and a text box. (In the figure toolbar, use the Insert drop-down menu, and the Text Arrow option.)
- (e) Label the horizontal and vertical axes.
- (f) Include a title for your plot (make up a fun one).

Include an image of the figure you have produced reflecting all of the above items.

Problem 3. Consider the following points:

$$(1, 10), (2, 8), (1, 6), (3, 9), (5, 7), (3, 7), (4, 6), (5, 4), (2, 9).$$

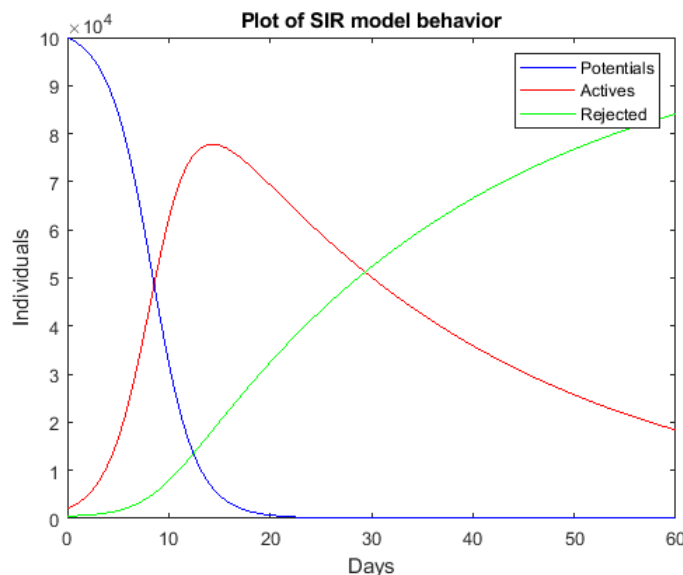
- (a) Use the `scatter` command to make a plot of the indicated points.
- (b) Mark each point with a solid diamond.
- (c) Label the horizontal axis “time t , in seconds.”
- (d) Label the vertical axis “height y , in feet.”
- (e) Title the plot “Time versus Height.”

Include an image of the figure you have produced reflecting all of the above items.

Problem 4. This problem requires the SIREulers.m file, which can be obtained from the MATLAB folder in the Files section of Canvas. To run SIREulers.m, execute the following command:

```
SIREulers(60,300,.000005,1/30,100000,2000,500);
```

(Do not forget to change the current folder in MATLAB to the one in which you have saved the m-file. If you do not do this, SIREulers.m will not run correctly.) When you run the SIREulers m-file, MATLAB will return four plots, one of them being



- In above figure, we want to make it so that the vertical axis is measured in thousands of individuals. This will get the “ 10×10^4 ” that is in the upper left corner of the figure changed to a more aesthetically pleasing form. The best way to do this is to go into the m-file and divide the appropriate vectors by 1000 in the last `plot` command. Once you locate the appropriate vectors, you can divide each by 1000 using `./1000` in the `plot` command. You will also need to relabel the vertical axis appropriately (the default label is no longer correct).
- By modifying the SIREulers.m file, make it so that all three curves are displayed in the color black with a thickness of 2pt, but with different line styles to differentiate between the three curves.

Include an image of the figure you have produced reflecting all of the above items.