Final Computational Project

For the final computational project, you will complete a solo project on a topic of your choice, following the requirements listed below.

The purpose of this assignment is threefold: (1) to practice graphical user interface design and construction in MATLAB, (2) to verify code implementation, and (3) to review content covered throughout the course.

Requirements:

1. a MATLAB GUI created by you
2. applied to a scientific or mathematical topic of your choice, that is not part of any GUI examples already used or readily available on the internet
3. some input is collected from users
4. a least one MATLAB built-in function (e.g., lsqcurvefit, ode23, fsolve, etc.) should be used to calculate something or process the information from the input (e.g., solve a system of ODEs or linear equations, estimate parameters of a simple model, optimize an objective function, calculate statistics, etc.)
5. display some output in the GUI window (e.g., 2D or 3D plot, bar graph, table, etc.)
6. package your GUI as a MATLAB app
7. compare your result to some known solution to verify that you indeed did your calculations correctly in the code. This could be through a solution in a textbook, research paper, or computational calculation example (MATLAB, Excel, etc.) from others
8. document your results in either a document or a video screencast. Briefly describe
    - the purpose of your project
    - what calculations are done
    - how your GUI results compare to the verification case

Items 1-6 are worth 80% of the total project grade and 7-8 are 20%

Rubric

Final project				
Criteria	Ratings			Pts
a MATLAB GUI created by you	20 pts Full Marks	0 pts No Marks		20 pts
used or readily available on the internet (e.g., bee simulation in CA5, sales ta	10 pts Full Marks	0 pts No Marks		10 pts
some input is collected from users	10 pts Full Marks	5 pts input is collected but not used	0 pts No Marks	10 pts
a least one MATLAB built-in function (e.g., lsqcurvefit, ode23, fsolve, etc.) should be used to calculate something or process the information from the input (e.g., solve a system of ODEs or linear equations, estimate parameters of a simple model, optimize an objective function, calculate statistics, etc.)	10 pts Full Marks	5 pts function is defined but not used	0 pts No Marks	10 pts
display some output in the GUI window	10 pts	5 pts	0 pts	10 pts
(e.g., 2D or 3D plot, bar graph, table, etc.)	Full Marks	output doesn't change with any user interaction with the gui	No Marks	
package your GUI as a MATLAB app	20 pts Full Marks	0 pts No Marks		20 pts
verification	5 pts	0 pts		5 pts
compare your result to some known solution to verify that you indeed did your calculations correctly in the code. This could be through a solution in a textbook, research paper, or computational calculation example (MATLAB, Excel, etc.) from others	Full Marks	No Marks		
document your results: purpose	2 pts	0 pts		2 pts
document your results in either a document file or or a video screencast. Briefly describe the purpose of the project	Full Marks	No Marks		
document your results: calculations	8 pts	0 pts		8 pts
document your results in either a document file or or a video screencast. Briefly describe what calculations are done	Full Marks	No Marks		
document your results: verification	5 pts	0 pts		5 pts
document your results in either a document file or or a video screencast. Briefly describe how your GUI results compare to the verification case	Full Marks	No Marks		
Total Points: 100				