

Homework 10

ENGR 130, FA 23

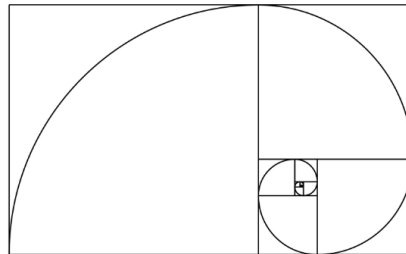
Submit the code for all three problems as one .m file. Follow all course guidelines for submitting the homework.

Problem 1 (4 points)

Go to the assignment HW10 – MATLAB Grader and complete the assignment that is linked there. Include a copy of the code you submit to MATLAB Grader in your submission to Canvas.

Problem 2 (9 points)

The Fibonacci sequence is a famous mathematical sequence that starts with 0 and 1, and each subsequent number is the sum of the two preceding ones. The Fibonacci sequence can be found in various aspects of nature, from the arrangement of leaves on a stem to the spiral patterns in pinecones and sunflowers. It's a sequence that appears in many unexpected places.



Create a MATLAB script and set of functions as described below to explore the Fibonacci sequence and calculate some statistics.

The main script will only do two things: ask the user for the number of terms in the sequence and call the function `fibonacci_gen_info`.

The function `fibonacci_gen_info` will take a positive integer as input, produce no output of its own, and call two other functions. The first function will take a positive integer as input and produce two outputs: a vector containing the Fibonacci sequence with the number of terms input and an integer that is the sum of the numbers in the sequence generated. The second function will take the Fibonacci vector and sum as inputs and then print the following information to the screen: the number of terms in the sequence, the sequence, and the sum of the numbers in the sequence, along with some accompanying explanatory text. This second function will not return any values to the rest of the program.

Problem 3 (8 points)

You are a botanist analyzing the growth of different types of plants. You have grown three species of flowers (referred to as A, B, and C), measured their heights each day, and recorded these data. They are stored in three vectors in the `HW10_heights.mat` file as follows: `species_A_heights`, `species_B_heights`, and `species_C_heights`. The first value in each vector is the height the day the seed was planted, which is called day 0; the second value

in the vector is the height 1 day after planting, etc. All heights are recorded in cm. Write a MATLAB script and function to perform the analysis detailed below:

The main script will pull in the data from the file and print all results from the function to the screen with accompanying explanatory text. The function will take the three height vectors as input and return to the script the following analysis results:

- Maximum height reached by each of the species
- How many days it takes each species to pass a height of 100 cm.
- The letter corresponding to the species that reaches the greatest height at any time.