BT2020 - Numerical Methods for Biology

Jan - May 2019
Assignment 2

6th March, 2019

Due date: 14th March, 2019 @17:00
Maximum Marks: 30
Instructions: Write MATLAB codes to solve the problems mentioned below. If you need any assistance, feel free to write to me or the TAs via Piazza (private note). Evaluation will be based on the codes and the logic.

Academic Integrity: You are allowed to discuss the problems verbally with your friends, but copying or looking at codes (either from your friend or the Web) is not permitted. Transgressions are easy to find, and will be reported to the "Sub-committee for the Discipline and Welfare of Students" and will be dealt with very strictly. Mention any collaboration (discussions only!) in your solutions.

Late submission penalties: 1 second – 24 h: 20%; 24–48 h: 40%; > 48 h: 60%

Early submission bonuses: > 24 h: 5%, > 48 h: 10%, > 72 h: 20%

Hints:

1. Please have a look at the following page (from Cosma Shalizi's blog), on minimal advice to undergraduates on programming:
http://cscs.umich.edu/~crshalizi/weblog/593.html

Problem Statement

2a (20 Marks) Write a function called bestFit(x, y) which tries to fit a 2nd degree, 3rd degree and 4th degree polynomials given x and y

as arguments. The function should calculate R² for each of the three fits and print the respective coefficients and R² values. It should also print which of the three is the best fit. We will be evaluate your function using various datasets

```
>> bestFit (x,y)
Fitting polynomials to y = F(x):
2 degree :
R^2 = 0.6546
Coeff = [c0 , c1 , c2]
3 degree :
R^2 = 0.9446
Coeff = [c0 , c1 , c2 , c3]
4 degree :
R^2 = -0.656
Coeff = [c0 , c1 , c2 , c3 , c4]
Best fit => 3 degree
```

2b (10 Marks) The number of people in one of the hostel messes at different points during the breakfast period was recorded. The data obtained is given in the file data.csv. The x values represent the time elapsed (in minutes) since 6:45AM. And the y values are the number of people found inside the mess at that particular time point. Fit y as a 2nd, 3rd or 4th degree polynomial function of x using the above function. Print the coefficients and R² values for the best fit.

How to Submit your Homework

- Submit your assignment ONLY via the submission link: http://tinyurl.com/bt2020-submit.
- You should not be signed into Dropbox while uploading this file (or use an incognito window to open the link), so that you can

enter the following details during submission, instead of Dropbox auto-filling it:

- First Name: Roll Number
- Last Name: Your Full Name
- E-mail: Your smail id

● Save your solution files as hw2a.m and hw2b.m. Do not use different filenames!

● Your submission files, hw2a.m and hw2b.m should begin with the header information shown below — the number of the assignment, your roll number, your collaborators' roll number(s), and approximately how much time you took to solve the problems in that part of the assignment.

● Submissions not adhering to any of the above instructions will not be evaluated.

● Also do not send the files by e-mail — obviously, they will not be evaluated.

```
% BT2020 Assignment 2
% Roll number : BE16B001
% Collaborators : BE16B002 , BE16B003
% Time: 1:15
```