Homework 1 Description
CmpE 362 Spring 2017

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Due: 1 March, 23:59, sharp

For problems 10-17, write a script called `signalAndNoise.m` and put all the commands in it. Separate and label different problems using comments.

10. Let x is vector of real numbers (-100:100)

    plot y1 = sinx, y2=sin50x, y3=50sinx, y4= sinx+50,y5= sin(x+50),y6= 50sin50x, y7= x*sinx, y8=sinx/x

    "Use 4x2 subplot to fit all subfigures belong to a single figure" (Hint: write help for SUBPLOT in MATLAB)

11. Let x is vector of real numbers (-20:20)

    Plot y1 = sinx, y2=sin50x, y3=50sinx, y4= sinx+50,y5= sin(x+50),y6= 50sin50x, y7= x*sinx, y8=sinx/x , y9= y1+y2+y3+y4+y5+y6+y7+y8

    "Use 5x2 subplot to fit all subfigures belong to a single figure"

12. *randn* generates zero-mean, unit variance Gaussian distributed random number in $(-\infty,\infty)$. Generate 41 random numbers following Gaussian distributed random numbers, call this as vector z.

    Plot y10= z, y11 = z+x , y12= z+sinx, y13= z sinx, y14=xsinz, y15= sin(x+z), y16= zsin50x, y17=sin(x+50z) y18=sinx/z, y19= y11+y12+y13+y14+y15+y16+y17+y18

    "Use 5x2 subplot to fit all subfigures belong to a single figure"

13. *rand* generates uniformly distributed random number in [0,1] . Generate 41 random numbers following uniformly distributed random numbers.
    Plot y20= z, y21 = z+x , y22= z+sinx, y23= z sinx, y24=xsinz, y25= sin(x+z), y26= zsin50x, y27=sin(x+50z) y28=sinx/z, y29= y21+y22+y23+y24+y25+y26+y27+y28

    "Use 5x2 subplot to fit all subfigures belong to a single figure"

14. Starting with z (0,1) Gaussian(Normal) Random variable. (Use help menu for "hist")
    a. Generate 10000 random variables with mean 0, variance 1; call it r1 vector
    b. Generate 10000 random variables with mean 0, variance 4; call it r2 vector
    c. Generate 10000 random variables with mean 0, variance 16; call it r3 vector
    d. Generate 10000 random variables with mean 0, variance 256; call it r4 vector

    Plot hist(r1), hist(r2), hist(r3),hist(r4) on the same figure for comparison purposes

15. Starting with z (0,1) Gaussian Random variable. (Use help menu for "hist")
    a. Generate 10000 random variables with mean 10, variance 1; call it r6 vector
    b. Generate 10000 random variables with mean 20, variance 4; call it r7 vector
    c. Generate 10000 random variables with mean -10, variance 1; call it r8 vector
    d. Generate 10000 random variables with mean -20, variance 4; call it r9 vector

    Plot hist(r6), hist(r7), hist(r8),hist(r9) on the same figure for comparison purposes

16. Starting with z (0,1) uniformly distributed random variable.
    a. Generate 10000 random variables with mean 0, variance 1; call it r11 vector
    b. Generate 10000 random variables with mean 0, variance 4; call it r21 vector
    c. Generate 10000 random variables with mean 0, variance 16; call it r31 vector
    d. Generate 10000 random variables with mean 0, variance 256; call it r41 vector

    Plot hist(r11), hist(r21), hist(r31),hist(r41) on the same figure for comparison purposes

17. Starting with z (0,1) uniformly distributed random variable. (Use help menu for "hist")
    a. Generate 10000 random variables with mean 10, variance 1; call it r61 vector
    b. Generate 10000 random variables with mean 20, variance 4; call it r71 vector
    c. Generate 10000 random variables with mean -10, variance 1; call it r81 vector
    d. Generate 10000 random variables with mean -20, variance 4; call it r91 vector

    Plot hist(r61), hist(r71), hist(r81),hist(r91) on the same figure for comparison purposes

18. Briefly describe what you have learnt from the above plots (plots from Questions 10-17).

19. Briefly describe what you have learnt about MATLAB. What were the challenges that you faced? What are the differences (advantages and disadvantages) between MATLAB and the other programming languages you have learned so far?

Submission and Grading

Prepare a report includes your code , explanations and comments of your code for each question. Figures would be in the report also. Add the answer to the 18th and 19th questions to your report.
Compress the report and code files. Name it as "YourNumber CmpE362 HW1.zip"(or rar, or 7z etc.). Send the file to yektasaid.can@gmail.com before the deadline. Subject of the mail would be CmpE362 HW1.

Notes

Deadline is strict. Do not send after deadline. When copying is detected, both parties will get zero.