MAT 202E - NUMERICAL METHOD

CRN: 20964

INSTRUCTOR: BERK CANBERK

HOMEWORK-2

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Question 1

Output of example usage

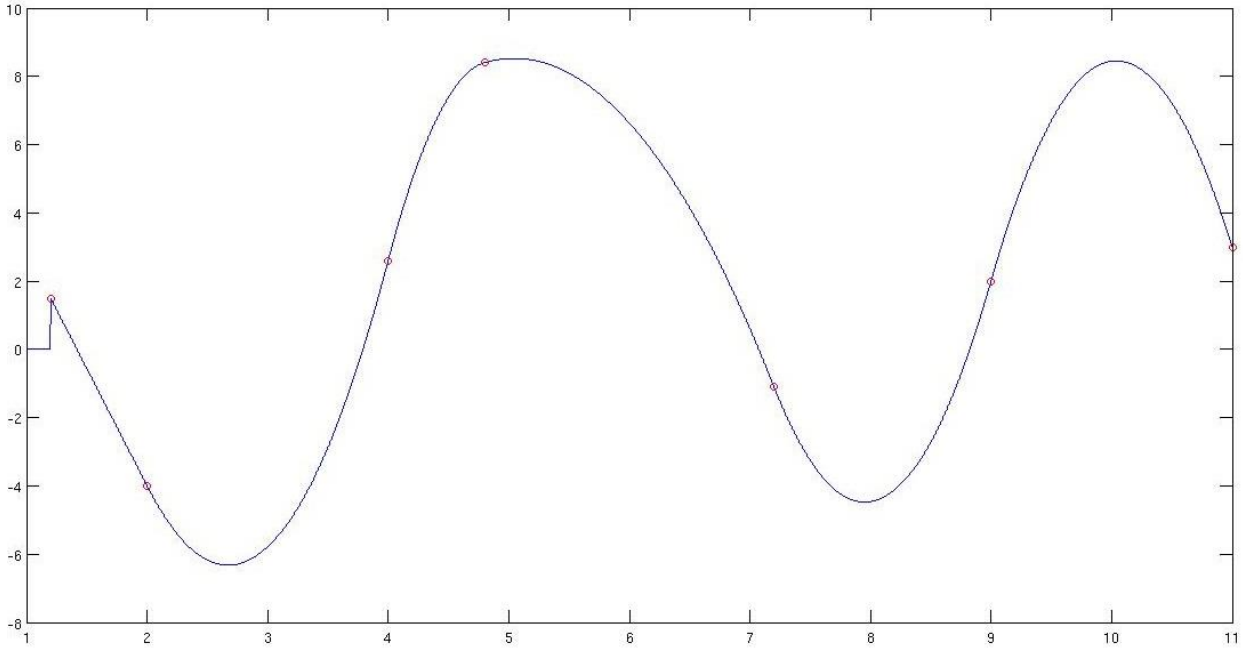
>> X=[2 4 1.2 4.8 7.2 9 11];

>> Y=[-4 2.6 1.5 8.4 -1.1 2 3];

>> xx=1:0.001:11;

>> yy=quadratic_spline(X, Y, xx);

>> plot(xx, yy, X, Y, 'ro');



Question 2

$X_2 \leq -(X_1)^2 + 2X_1 + 15$ $X_2 \geq (X_1)^2 - 4X_1$

Multiply equations by 3

$3X_2 \leq -3(X_1)^2 + 6X_1 + 45$ $3X_2 \geq 3(X_1)^2 - 12X_1$

Add $2X_1$ to equations

$2X_1 + 3X_2 \leq -3(X_1)^2 + 8X_1 + 45$ $3X_2 + 2X_1 \geq 3(X_1)^2 - 10X_1$

Combine these two equations

$3(X_1)^2 - 10X_1 \leq 2X_1 + 3X_2 \leq -3(X_1)^2 + 8X_1 + 45$

Derivate right and left side equations and sync to zero for find min-max value of equations

$6X_1 - 10 = 0$ $-6X_1 + 8 = 0$

$X_1 = 5/3$ $X_1 = 4/3$

Min value for left side is: Max value for right side is:

$3(5/3)^2 - 10(5/3) = -25/3 = -8,33$ $-3(4/3)^2 + 8(4/3) + 45 = 151/3 = 50,33$

Result:

$-8,33 \leq 2X_1 + 3X_2 \leq 50,33$

Question 3

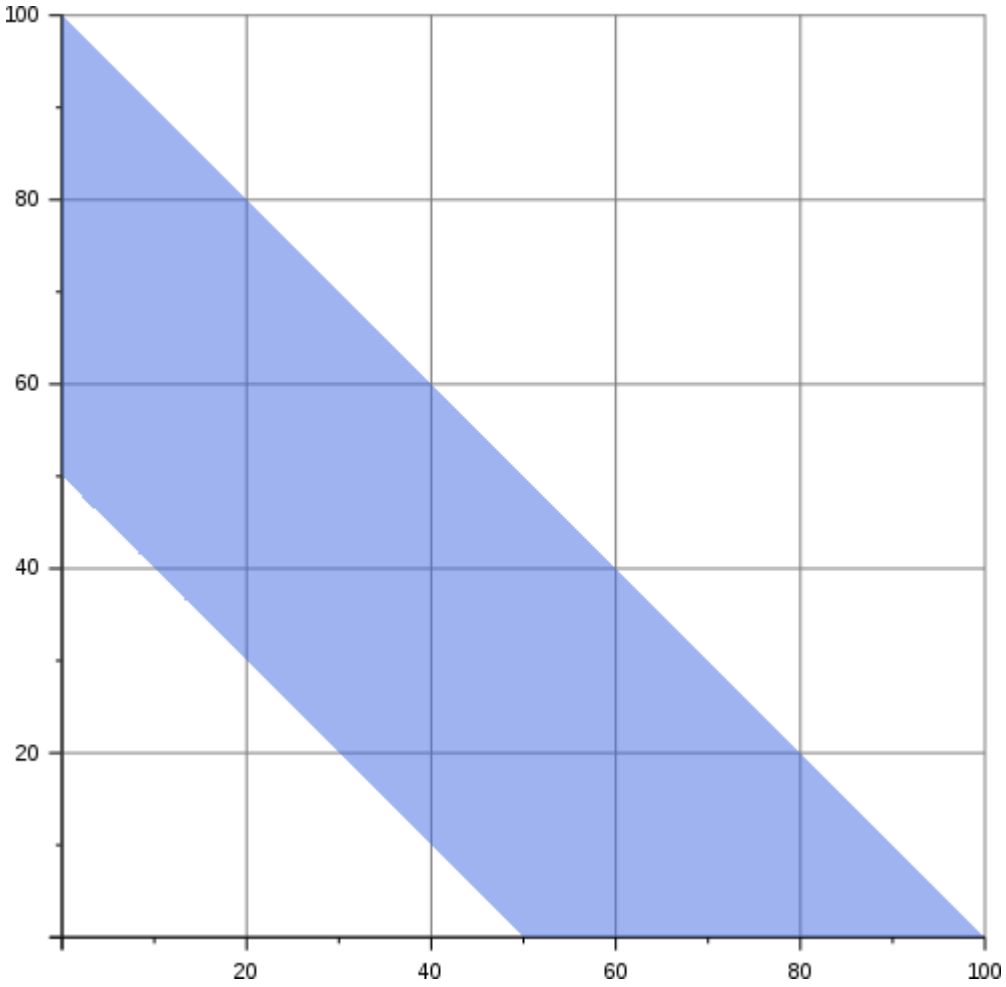
a, b and c are edge of triangle.

a + b + c = 100

Sum of two edges must be larger than the other edge to make a triangle. An edge of triangle can be large as half of sum of all edges but not equal.

a + b > 50, c < 50 **a + c > 50, b < 50** **b + c > 50, a < 50**

These graph for probability of a + b > 50 or a + c > 50 or b + c > 50



One edge must be smaller than 50 : **(100x100)/2 - (50x50)/2**

All probabilities : **(100x100)/2**

Probability is **(5000-1250)/5000 = (4-1)/4 = 3/4**