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1 % Ian Woodbury
2 % 05/12/2022
3 % 214 PS-C2 : Service Fees
4 % Part 1 : Set up the pdf and the cdf,
5 % then use them to analyze service fees
6
7 clear
8
9 clf
10
11 % ---- Givens ---- %
12
13 % $20 fixed fee
14 % $25/hr for 1st 6 hrs
15 % Time is equally likely between [0,10]
16
17 p0 = 20;    % intial point of price
18 pm = 25;    % slope of the price over time 0<T<6
19
20 % Time span t in hours, 400 points for good graph
21 t = linspace(0, 10, 400);
22
23 % function of price over time in $
24 % heaviside functions as step function,
25 % multiplied by (t-6) to create ramp function
26 y = p0 + pm*t - pm*(t-6).*heaviside(t-6);
27
28 % PDF:
29 % Pretty much 1 + impulse at t = 6hrs since t only has range to 10hrs
30 f = 1 + 4*heaviside(t-6);
31
32
33 % ---- Plotting ---- %
34 subplot(2,1,1) % sets up subplot, 3 rows, 1 column, 1st plot
35 plot(y, f/10) % plots pdf function
36 axis([0 200 0 1]) % sets up axis for x and y values
37 grid on
38 ax.GridAlpha = 0.3; % Makes grid darker
39 xlabel("Cost($)", "FontSize", 14) % label for x axis,
40 ylabel("% Chance", "FontSize", 14) % label for y axis,
41 title("214 PS-C2, PDF", "FontSize", 20)
42
43 subplot(2,1,2) % sets up subplot, 3 rows, 1 column, 1st plot
44 plot(y, t/10) % plots cdf function
45 axis([0 200 0 1]) % sets up axis for x and y values
46 grid on
47 ax.GridAlpha = 0.3; % Makes grid darker
48 xlabel("Cost($)", "FontSize", 14) % label for x axis,
49 ylabel("% Chance", "FontSize", 14) % label for y axis,
50 title("214 PS-C2, CDF", "FontSize", 20)
51
52
53 % Chance for cost under $60 is 16%, found in CDF, or using:
54 %  $t = (60 - 20)/25 = 1.6 \Rightarrow 16\%$  for chance
55
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