

TIE4203 Decision Analysis in Industrial & Operations Management Tutorial #8

Question 1 (P7.1)

Given the following data:

5.3299	4.2537	3.1502	3.7032	1.6070	6.3923
3.1181	6.5941	3.5281	4.7433	0.1077	1.5977
5.4920	1.7220	4.1547	2.2799		

- (a) Plot a histogram representing the data.
- (b) Fit a normal distribution to the data using any suitable method.
- (c) Plot the PDF of the fitted normal distribution and compare it with the plot in (a).

Question 2 (P7.2)

Use DPL to find the discrete approximation of the following distributions with 3 branches:

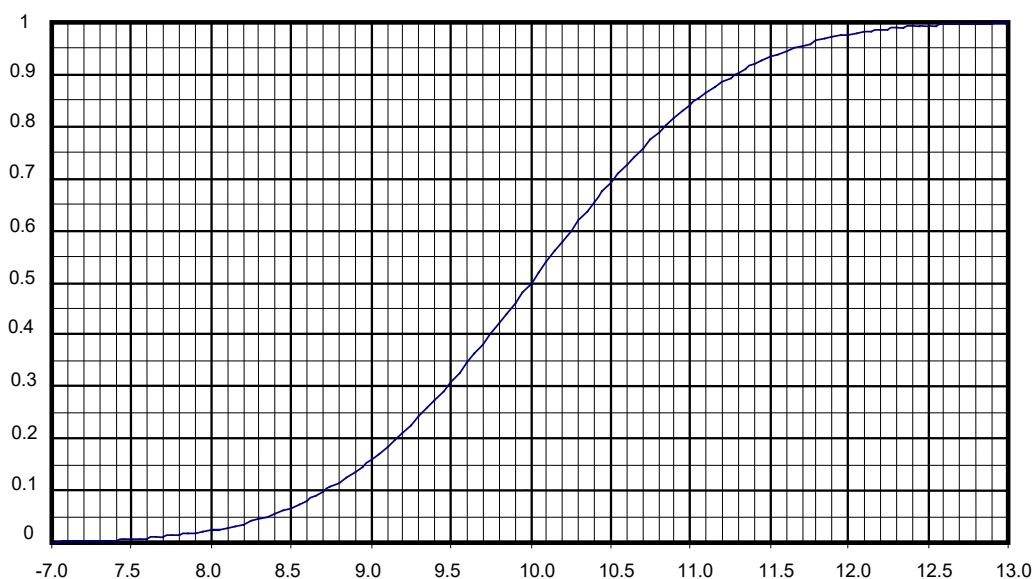
- (a) A triangular distribution with $min=0$, $max=10$, $mode=5$.
- (b) An exponential distribution with $mean=10$.
- (c) A uniform distribution with $min=10$ and $max=20$.

Question 3 (P7.3)

William faces an investment alternative whose net present value has a normal distribution with a mean of \$10 million and a standard deviation of \$1 million. William follows the Delta property and has a risk tolerance of \$5 million. Use DPL to determine and compare the certainty equivalent of this investment proposal using:

- (a) Discrete 3-branch approximation (moments matching).
- (b) Standard/SDG 3-branch quick approximation.
- (c) Pearson-Tukey approximation.

The CDF for the distribution Normal (10, 1) is given below:



Question 4 (P7.5)

A retail manager in a discount store wants to establish a policy of the number of cashiers to have on hand and also when to open a new cash register. The first step in this process is to determine the rate at which customers arrive at the cash register. One day, the manager observes the following times (in minutes) between arrivals of customers at the cash registers:

0.1	2.6	2.9	0.5
1.2	1.8	4.8	3.3
1.7	0.2	1.5	2.0
4.2	0.6	1.0	2.6
0.9	3.4	1.7	0.4

Assuming that customers' arrival is a poisson process, fit an exponential distribution with one parameter λ to the data.

Question 5 (P7.6)

An ecologist studying the breeding habits of birds sent volunteers from the local chapter of the Audubon Society into the field to count nesting sites for a particular species. Each team was to survey five acres of land carefully. Because she was interested in studying the distribution of nesting sites within a particular kind of ecological system, the ecologists were careful to choose survey sites that were as similar as possible. In total, 24 teams survey five acres each and reported the following numbers of nesting sites in each of the five-acre parcels:

7	12	6	9
5	2	9	9
7	3	9	9
5	1	7	10
1	8	6	3
4	5	3	13

- (a) Plot a histogram for these data.
- (b) Fit a probability distribution to the data using any suitable method.
- (c) Compare the PMF of the fitted distribution with the histogram plotted in (a).