Assignment 5, MECO 6315

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Answer to Question 1

I generated x from uniform distribution between zero and one, since the domain of the Burr distribution was also approximately between zero and one. I generated 10,000 value for the $xf(x)$, and $x^2.f(x)$ and calculated the mean and variance. The result of the simulated mean, and variance, and alpha and beta that calculated from them using $\alpha = (\frac{1-\mu}{\sigma^2} - \frac{1}{\mu})\mu^2$, and $\beta = \alpha(\frac{1}{\mu} - 1)$, is shown in the following table:

In the following figure I plotted beta distribution in red, and Burr distribution in blue. As λ increases beta would become better estimation for Burr distribution. Both distributions are right skewed, mean have skewness greater than zero. As mode of Burr distribution increases parameter of beta distribution mean α and β would become equal.

Answer to Question 2

Cauchy distribution is simulated five times with size 1000, and then it is plotted in the normal probability plot. As tails show there is no fit between two distributions. The figure shows the plot.

MATLAB code is attached.

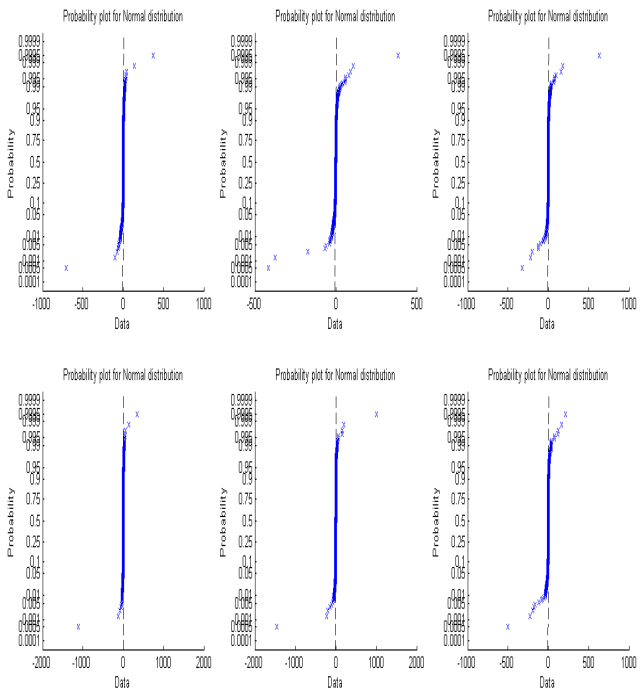

Figure 2: Cauchy distribution in probability plot; five times simulation with size 1000.

λ	μ	σ^2	α	β
0.1000	0.1051	0.0011	8.9335	76.0446
0.2000	0.2147	0.0049	7.1159	26.0298
0.3000	0.3076	0.0146	4.1704	9.3855
0.4000	0.4098	0.0250	3.5497	5.1126
0.5000	0.5019	0.0324	3.3655	3.3398

Table 1: Estimated Mean, Variance of Burr XI dist., and corresponding beta parameters

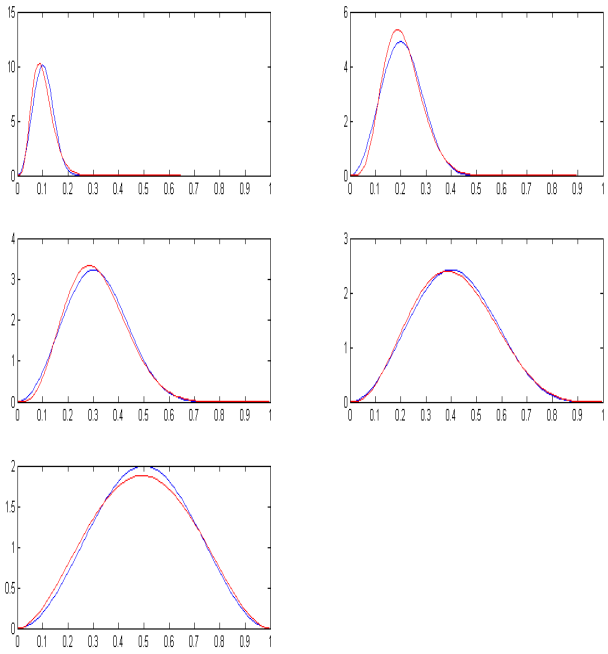

Figure 1: Burr distribution against Beta distribution. From top left to bottom right mode of burr distribution increases from .1 to .5. The mean variance and parameter corresponding to this is showen in the table.