International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Skewness and Kurtosis of Exponential-Uniform Generating Families of Continuous Distributions

P. Jyothi[1], N. Rajendra Prasad[2]

[1]University Arts and Science College, Kakatiya University, Warangal, Telangana, India

[2]Product Inspector, Mississauga Office, Canada

Abstract: ***In this paper, we study the generating families of continuous distributions of T-X where T and X follow the exponential and uniform distributions respectively. The probability density function of T-X is obtained for the selected transformer W(F(X)). The skewness and kurtosis are computed for the parameter of exponential distribution and they are shown graphically. Further, probability density function curves are drawn for different values of the parameter of exponential distribution.***

Keywords: Skewness, kurtosis, exponential distribution, uniform distribution, probability density function, T-X family

1. Introduction

The various classical distributions have been used for modeling data in the fields of engineering, medical , biological and environmental sciences, economics, demography, insurance and finance. Recently, some attempts have been made by the researchers to define new families of distributions and they provide great flexibility in modeling the data. A few well-known generators are the Marshall and Olkin [1], the beta-G by Eugene et.al.[2], the Kumarswamy-G by Cordeivo and decastro[3], the Mc.Donala-G by Alexander et.al. [4], the transformer (T-X) by Alzaatrech et. Al. [5], the Weilbull-G by Bourguignen et.al. [6] and exponentiated half-logistic family by Cordeiro et.al.[7]. The common feature of these generalized distributions is that they have more parameters. Johnson et.al.[8] stated that the use of four parameter distribution should be sufficient for most practical purposes. A new method for generating families of continuous distributions is developed by Alzaatrech et.al.[5]. Using this method new families of distributions are obtained by considering exponential (T) and uniform distributions (X) with transformer W(F(x))= $\frac{F(x)}{1-F(x)}$. The probability density function is derived for these new families of transformed-transformer or T-X distributions. The skewness and kurtosis of the generated family of transformed-transformer distributions are found and they are shown graphically. Further, the probability density function curves are also drawn for different values of the parameters of T-X distributions.

2. Generating Families of Exponential-Uniform Distributions

Suppose X is a random variable of uniform distribution on [a, b]. Then its probability density function f(x) is

$$f(x)=\frac{1}{(b-a)} \quad a\le x\le b \qquad (2.1)$$

Further, let T be a random variable of exponential distribution with probability density function r(t). Then,

$$r(t)=\theta\, e^{-\theta t},\ t\succ 0,\theta\succ 0 \qquad (2.2)$$

The cumulative distribution function of new families of transformed-transformer or T-X distribution is defined by [6] as

$$G(x)=\int_a^{W(F(x))} r(t)\,dt \qquad (2.3)$$

where W(F(x)) is a function of cumulative distribution function F(x). The cumulative distribution function of the random variable X is

$$F(x)=\frac{x-a}{b-a} \qquad (2.4)$$

Now, we choose the transformer function W(F(x)) as W(F(x))= $\frac{F(x)}{1-F(x)}$. Then,

$$W(F(x))=\frac{(x-a)}{(b-x)} \qquad (2.5)$$

In view of equations (2.2) and (2.5) the equation (2.3) reduces to

$$G(x)=e^{-a\theta}-e^{-\frac{\theta(x-a)}{(b-x)}} \qquad (2.6)$$

The probability density function g(x) associated with G(x) is given by

$$g(x)=\frac{(b-a)}{(b-x)^2}\theta\, e^{-\frac{\theta(x-a)}{(b-x)}} \qquad (2.7)$$

3. Skewness and Kurtois of Exponential Uniform Distributions

The measure of skewness S defined by Galton[9] and the measure of kurtosis K defined by Moors[10] are based on quantile

$$S=\frac{Q\left(\frac{6}{8}\right)-2Q\left(\frac{4}{8}\right)+Q\left(\frac{2}{8}\right)}{Q\left(\frac{6}{8}\right)-Q\left(\frac{2}{8}\right)} \qquad (2.8)$$

functions and they are defined as:

$$K=\frac{Q\left(\frac{7}{8}\right)-Q\left(\frac{5}{8}\right)+Q\left(\frac{3}{8}\right)-Q\left(\frac{1}{8}\right)}{Q\left(\frac{6}{8}\right)-Q\left(\frac{2}{8}\right)} \qquad (2.9)$$

The quantile function of exponential-uniform distribution is the solution of the equation G(x)=p, $0\leq p\leq 1$. Hence,

$$Q(p)=\frac{a\theta-\log(e^{-a\theta}-p)}{\theta-\log(e^{-a\theta}-p)} \qquad (2.10)$$

In this section we present the values of probability distribution function , skewness and kurtosis of T-X distributions for different values of the parameters θ, a and b. Further they are shown graphically.

The probability density function values of T-X distributions are computed using (2.7) for a=0,b=4.001 and theta=0.2, 0.3, 0.4, 0.5 and they are given in the Table-1. These are show graphically in the Fig.1. It is observed that the values of g(x) are increasing with increase in θ.

4. Numerical Calculations

Table 1: The values of T-X distribution function g(x)

	g(x)				x	g(x)			
x	θ=0.2	θ=0.3	θ=0.4	θ=0.5		θ=0.2	θ=0.3	θ=0.4	θ=0.5
0	0.049988	0.074981	0.099975	0.124969	2	0.16364	0.222112	0.267981	0.303114
0.04	0.050899	0.076272	0.101593	0.126863	2.04	0.168999	0.228453	0.274509	0.309235
0.08	0.051836	0.077596	0.10325	0.1288	2.08	0.174621	0.235051	0.28124	0.315474
0.12	0.052799	0.078954	0.104947	0.130779	2.12	0.18052	0.241919	0.288178	0.321827
0.16	0.053789	0.080348	0.106685	0.132802	2.16	0.186716	0.249068	0.295326	0.32829
0.2	0.054807	0.081778	0.108466	0.134871	2.2	0.193228	0.256513	0.302689	0.334855
0.24	0.055853	0.083247	0.11029	0.136986	2.24	0.200076	0.264267	0.31027	0.341513
0.28	0.05693	0.084755	0.11216	0.139149	2.28	0.207284	0.272346	0.318071	0.348255
0.32	0.058038	0.086304	0.114076	0.141361	2.32	0.214875	0.280763	0.326092	0.355068
0.36	0.059179	0.087895	0.116041	0.143624	2.36	0.222877	0.289533	0.334333	0.361936
0.4	0.060354	0.089531	0.118055	0.145939	2.4	0.231318	0.298674	0.342793	0.36884
0.44	0.061563	0.091211	0.120121	0.148308	2.44	0.240228	0.308198	0.351467	0.375759
0.48	0.06281	0.092939	0.12224	0.150731	2.48	0.249641	0.318123	0.360348	0.382666
0.52	0.064094	0.094715	0.124414	0.153212	2.52	0.259593	0.328464	0.369427	0.38953
0.56	0.065417	0.096542	0.126645	0.155751	2.56	0.270123	0.339234	0.37869	0.396314
0.6	0.066782	0.098422	0.128934	0.158349	2.6	0.281273	0.350447	0.388118	0.402974
0.64	0.06819	0.100356	0.131284	0.16101	2.64	0.293088	0.362115	0.397689	0.409459
0.68	0.069643	0.102347	0.133697	0.163734	2.68	0.305616	0.374248	0.407371	0.415711
0.72	0.071142	0.104397	0.136174	0.166523	2.72	0.318911	0.386852	0.417127	0.42166
0.76	0.07269	0.106507	0.138719	0.169379	2.76	0.333027	0.399929	0.426908	0.427225
0.8	0.074288	0.108682	0.141332	0.172305	2.8	0.348025	0.413476	0.436655	0.432312
0.84	0.07594	0.110922	0.144018	0.175301	2.84	0.363968	0.427482	0.446294	0.436813
0.88	0.077646	0.113231	0.146777	0.178371	2.88	0.380921	0.441927	0.455736	0.440602
0.92	0.079411	0.115612	0.149614	0.181516	2.92	0.398955	0.456776	0.464869	0.443536
0.96	0.081235	0.118067	0.15253	0.184738	2.96	0.418139	0.47198	0.473559	0.445447
1	0.083123	0.120599	0.155528	0.188039	3	0.438545	0.487469	0.481646	0.446149
1.04	0.085077	0.123212	0.158612	0.191422	3.04	0.46024	0.503144	0.488931	0.445425
1.08	0.0871	0.125908	0.161784	0.194889	3.08	0.483289	0.518873	0.495181	0.443034
1.12	0.089196	0.128692	0.165047	0.198443	3.12	0.507741	0.534479	0.500112	0.438707
1.16	0.091367	0.131568	0.168405	0.202085	3.16	0.53363	0.549729	0.503389	0.432146
1.2	0.093618	0.134538	0.171861	0.205818	3.2	0.56096	0.564316	0.504615	0.423028
1.24	0.095953	0.137608	0.175419	0.209644	3.24	0.589688	0.577844	0.503322	0.41101
1.28	0.098374	0.140781	0.179082	0.213566	3.28	0.619707	0.589803	0.49897	0.395743
1.32	0.100888	0.144062	0.182854	0.217586	3.32	0.650806	0.599537	0.49094	0.376887
1.36	0.103498	0.147455	0.186739	0.221707	3.36	0.682629	0.606216	0.478538	0.354142
1.4	0.10621	0.150967	0.190741	0.225932	3.4	0.714608	0.608792	0.461017	0.327292
1.44	0.109029	0.154601	0.194864	0.230262	3.44	0.745868	0.605966	0.437604	0.296269
1.48	0.111959	0.158364	0.199113	0.2347	3.48	0.77509	0.596154	0.407579	0.261238
1.52	0.115009	0.162261	0.203491	0.239248	3.52	0.800327	0.577482	0.370388	0.222713
1.56	0.118182	0.166299	0.208005	0.243909	3.56	0.818743	0.547838	0.325839	0.181688
1.6	0.121488	0.170484	0.212657	0.248685	3.6	0.826284	0.505045	0.274396	0.139765
1.64	0.124932	0.174822	0.217455	0.253578	3.64	0.817292	0.447265	0.21757	0.099222
1.68	0.128522	0.179322	0.222401	0.25859	3.68	0.784193	0.373793	0.158375	0.062909
1.72	0.132267	0.18399	0.227502	0.263722	3.72	0.717646	0.28646	0.10164	0.033809
1.76	0.136176	0.188835	0.232763	0.268977	3.76	0.608165	0.191664	0.053692	0.014101
1.8	0.140257	0.193865	0.238188	0.274355	3.8	0.451542	0.102267	0.020588	0.003886
1.84	0.144521	0.199088	0.243784	0.279858	3.84	0.261747	0.036153	0.004439	0.000511

1.88	0.14898	0.204515	0.249556	0.285485	3.88	0.089619	0.005443	0.000294	0.000015
1.92	0.153644	0.210154	0.255509	0.291237	3.92	0.007633	0.000091	0.000001	0
1.96	0.158526	0.216016	0.261649	0.297114	3.96	0.000002	0	0	0
					4	0	0	0	0

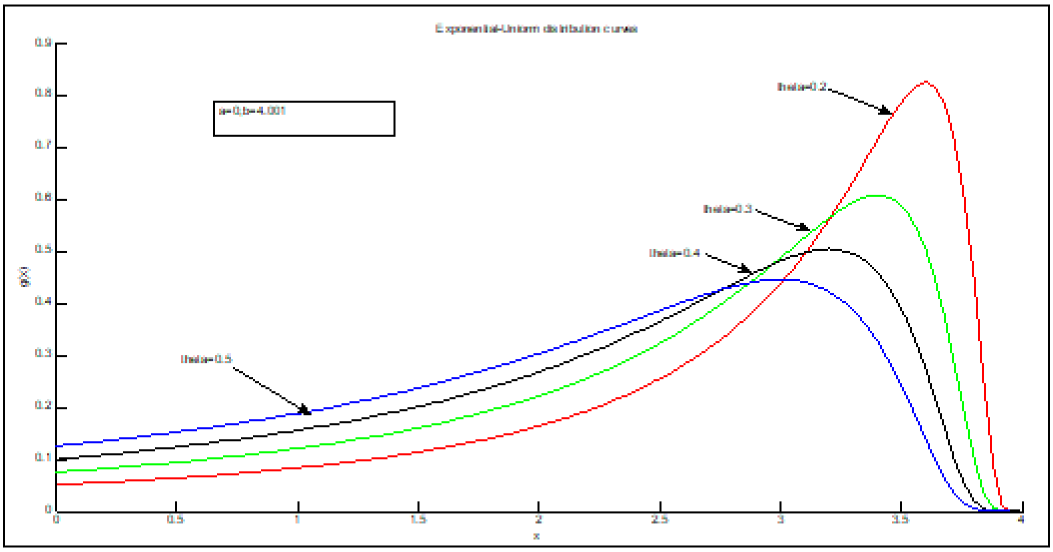

Figure 1

The probability density function values of T-X distributions are computed using (2.7) for a=0,b=4.001 and θ=2,4,6,8 $(\theta \succ 1)$ and they are given in the Table-2. These are show graphically in the Fig.2. It is observed that the values of g(x) are also increasing with increase for $(\theta \succ 1)$.

Table 2: The values of T-X distribution function g(x) for $\theta \succ 1$

	θ				x	θ			
x	2	4	6	8		2	4	6	8
0	0.5	0.979901	1.5	1.882197	2	0.270671	0.073263	0.014873	0.002684
0.04	0.499949	0.959611	1.440456	1.768775	2.04	0.259738	0.064792	0.012122	0.002016
0.08	0.499795	0.939138	1.381848	1.65971	2.08	0.248609	0.056961	0.009788	0.001495
0.12	0.499532	0.918491	1.324211	1.554972	2.12	0.237302	0.049758	0.007825	0.001094
0.16	0.499156	0.897682	1.267579	1.454528	2.16	0.225843	0.043171	0.006189	0.000789
0.2	0.498664	0.876719	1.211988	1.358335	2.2	0.214258	0.037184	0.00484	0.00056
0.24	0.498049	0.855616	1.157471	1.266349	2.24	0.202576	0.031779	0.003739	0.000391
0.28	0.497309	0.834383	1.104059	1.178519	2.28	0.19083	0.026933	0.002851	0.000268
0.32	0.496438	0.813033	1.051785	1.094787	2.32	0.179057	0.022623	0.002144	0.000181
0.36	0.495431	0.791581	1.00068	1.015092	2.36	0.167294	0.018819	0.001588	0.000119
0.4	0.494282	0.770039	0.950772	0.939367	2.4	0.155585	0.015492	0.001157	0.000077
0.44	0.492988	0.748422	0.902091	0.867539	2.44	0.143972	0.012611	0.000828	0.000048
0.48	0.491542	0.726747	0.854661	0.79953	2.48	0.132505	0.010141	0.000582	0.00003
0.52	0.489939	0.705029	0.80851	0.735259	2.52	0.121232	0.008048	0.000401	0.000018
0.56	0.488174	0.683284	0.763659	0.674638	2.56	0.110206	0.006296	0.00027	0.00001
0.6	0.486241	0.661531	0.720132	0.617575	2.6	0.099481	0.004849	0.000177	0.000006
0.64	0.484134	0.639788	0.677948	0.563974	2.64	0.08911	0.003672	0.000113	0.000003
0.68	0.481848	0.618074	0.637124	0.513735	2.68	0.079149	0.002729	0.000071	0.000002
0.72	0.479376	0.596408	0.597676	0.466754	2.72	0.06965	0.001987	0.000043	0.000001
0.76	0.476713	0.574812	0.559618	0.422923	2.76	0.060665	0.001415	0.000025	0
0.8	0.473852	0.553305	0.522961	0.382132	2.8	0.052242	0.000983	0.000014	0
0.84	0.470788	0.531909	0.487714	0.344266	2.84	0.044425	0.000664	0.000007	0
0.88	0.467514	0.510648	0.453881	0.30921	2.88	0.037251	0.000435	0.000004	0
0.92	0.464023	0.489542	0.421467	0.276846	2.92	0.030749	0.000276	0.000002	0
0.96	0.460311	0.468617	0.390472	0.247052	2.96	0.024939	0.000168	0.000001	0
1	0.456371	0.447896	0.360894	0.219709	3	0.01983	0.000098	0	0
1.04	0.452196	0.427402	0.332727	0.194692	3.04	0.015418	0.000055	0	0
1.08	0.447781	0.407161	0.305963	0.171881	3.08	0.011685	0.000029	0	0
1.12	0.443119	0.387197	0.28059	0.151151	3.12	0.008602	0.000014	0	0
1.16	0.438205	0.367535	0.256594	0.132381	3.16	0.006123	0.000007	0	0
1.2	0.433034	0.348201	0.233958	0.115449	3.2	0.004193	0.000003	0	0
1.24	0.427599	0.32922	0.21266	0.100235	3.24	0.002745	0.000001	0	0

1.28	0.421895	0.310617	0.192677	0.086622	3.28	0.001704	0	0	0
1.32	0.415918	0.292417	0.173982	0.074494	3.32	0.000994	0	0	0
1.36	0.409663	0.274644	0.156545	0.063738	3.36	0.000538	0	0	0
1.4	0.403127	0.257322	0.140333	0.054243	3.4	0.000266	0	0	0
1.44	0.396304	0.240476	0.12531	0.045904	3.44	0.000118	0	0	0
1.48	0.389193	0.224127	0.111439	0.038619	3.48	0.000046	0	0	0
1.52	0.381791	0.208298	0.098679	0.032289	3.52	0.000015	0	0	0
1.56	0.374096	0.19301	0.086986	0.026822	3.56	0.000004	0	0	0
1.6	0.366107	0.178281	0.076315	0.022128	3.6	0.000001	0	0	0
1.64	0.357825	0.16413	0.066619	0.018124	3.64	0	0	0	0
1.68	0.34925	0.150573	0.05785	0.014732	3.68	0	0	0	0
1.72	0.340384	0.137625	0.049956	0.01188	3.72	0	0	0	0
1.76	0.331231	0.125299	0.042887	0.009498	3.76	0	0	0	0
1.8	0.321796	0.113604	0.036591	0.007527	3.8	0	0	0	0
1.84	0.312085	0.102549	0.031015	0.005908	3.84	0	0	0	0
1.88	0.302107	0.092139	0.026107	0.004591	3.88	0	0	0	0
1.92	0.29187	0.082377	0.021815	0.00353	3.92	0	0	0	0
1.96	0.281386	0.082377	0.018087	0.018087	3.96	0	0	0	0

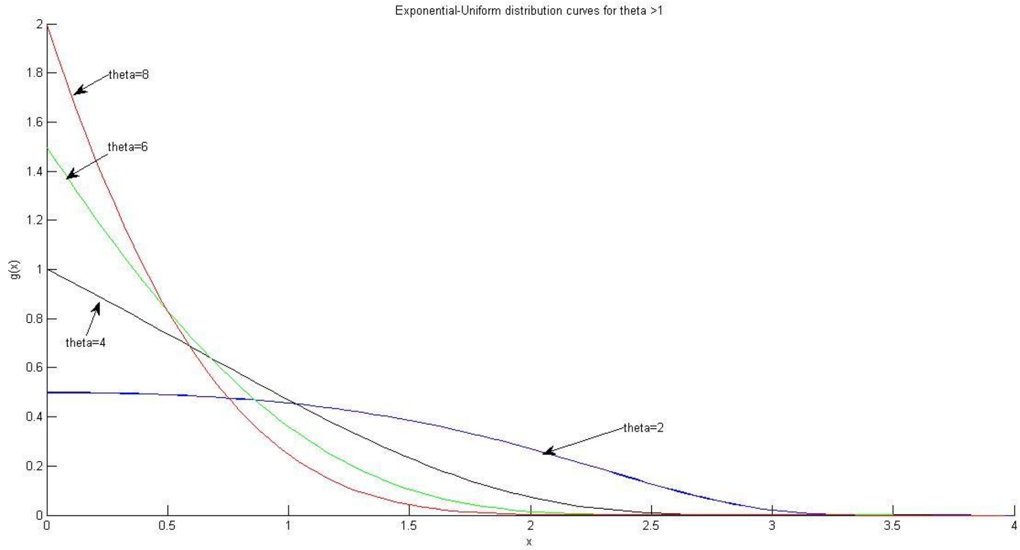

Figure 2

The skewness of T-X distributions are computed using (2.9) for b=2,a=0,0.02,0.04,0.05 for various values of θ and they are given in the Table-3. These are show graphically in the Fig.3. It is observed that the values of skewness are increasing with increase in θ.

Table 3: The skewness values of T-X distribution

θ	a				θ	a			
	0	0.02	0.04	0.05		0	0.02	0.004	0.005
0	0.324701	0.324701	0.324701	0.324701	2.5	0.214529	0.254086	0.301215	0.328659
0.05	0.221304	0.223552	0.225787	0.226899	2.55	0.215254	0.255516	0.303722	0.331927
0.1	0.176014	0.180193	0.18434	0.186401	2.6	0.215958	0.256927	0.306225	0.335209
0.15	0.154388	0.160156	0.165879	0.168723	2.65	0.216641	0.258321	0.308725	0.338506
0.2	0.144068	0.151172	0.158226	0.161735	2.7	0.217304	0.259698	0.311224	0.34182
0.25	0.139674	0.147937	0.156152	0.160242	2.75	0.217949	0.261059	0.313723	0.345153
0.3	0.13857	0.147862	0.157118	0.161734	2.8	0.218575	0.262405	0.316223	0.348507
0.35	0.139349	0.149578	0.159789	0.16489	2.85	0.219184	0.263736	0.318724	0.351882
0.4	0.141219	0.152316	0.163421	0.16898	2.9	0.219776	0.265054	0.321229	0.355283
0.45	0.143714	0.155627	0.167581	0.173578	2.95	0.220352	0.26636	0.323737	0.358709
0.5	0.146552	0.15924	0.172011	0.178432	3	0.220912	0.267653	0.326251	0.362163
0.55	0.149556	0.16299	0.176554	0.18339	3.05	0.221458	0.268934	0.328771	0.365646
0.6	0.152617	0.166774	0.181114	0.188359	3.1	0.22199	0.270205	0.331298	0.369161
0.65	0.155666	0.170527	0.185631	0.193284	3.15	0.222508	0.271465	0.333832	0.372709
0.7	0.158659	0.174212	0.190072	0.198129	3.2	0.223013	0.272715	0.336376	0.376293
0.75	0.161572	0.177803	0.194414	0.202878	3.25	0.223505	0.273956	0.33893	0.379914
0.8	0.164388	0.181289	0.19865	0.207521	3.3	0.223985	0.275188	0.341494	0.383574
0.85	0.167098	0.184663	0.202773	0.212054	3.35	0.224453	0.276411	0.344071	0.387275

0.9	0.1697	0.187924	0.206783	0.216479	3.4	0.22491	0.277627	0.346659	0.39102
0.95	0.172193	0.191072	0.210683	0.220798	3.45	0.225356	0.278835	0.349262	0.39481
1	0.17458	0.19411	0.214478	0.225015	3.5	0.225791	0.280035	0.351878	0.398648
1.05	0.176862	0.197042	0.21817	0.229137	3.55	0.226216	0.281229	0.35451	0.402537
1.1	0.179043	0.199873	0.221767	0.233168	3.6	0.226632	0.282417	0.357158	0.406478
1.15	0.181129	0.202606	0.225272	0.237116	3.65	0.227038	0.283599	0.359823	0.410474
1.2	0.183124	0.205248	0.228693	0.240985	3.7	0.227434	0.284775	0.362507	0.414528
1.25	0.185031	0.207803	0.232034	0.244781	3.75	0.227822	0.285946	0.365209	0.418644
1.3	0.186856	0.210277	0.2353	0.248511	3.8	0.228201	0.287112	0.36793	0.422822
1.35	0.188603	0.212672	0.238497	0.252179	3.85	0.228572	0.288273	0.370673	0.427068
1.4	0.190275	0.214995	0.24163	0.255791	3.9	0.228935	0.289429	0.373437	0.431384
1.45	0.191878	0.21725	0.244703	0.259352	3.95	0.22929	0.290582	0.376224	0.435773
1.5	0.193415	0.219439	0.24772	0.262866	4	0.229638	0.291731	0.379035	0.44024
1.55	0.194889	0.221568	0.250685	0.266338	4.05	0.229978	0.292876	0.38187	0.444788
1.6	0.196304	0.22364	0.253603	0.269771	4.1	0.230311	0.294018	0.38473	0.449422
1.65	0.197663	0.225657	0.256477	0.27317	4.15	0.230637	0.295156	0.387617	0.454145
1.7	0.198969	0.227624	0.25931	0.276539	4.2	0.230957	0.296292	0.390532	0.458964
1.75	0.200226	0.229543	0.262105	0.27988	4.25	0.23127	0.297426	0.393476	0.463882
1.8	0.201434	0.231416	0.264866	0.283198	4.3	0.231577	0.298556	0.39645	0.468907
1.85	0.202598	0.233247	0.267596	0.286494	4.35	0.231878	0.299685	0.399454	0.474043
1.9	0.203719	0.235038	0.270296	0.289773	4.4	0.232173	0.300812	0.402491	0.479297
1.95	0.2048	0.236791	0.27297	0.293038	4.45	0.232462	0.301937	0.405561	0.484678
2	0.205843	0.238508	0.275619	0.29629	4.5	0.232746	0.30306	0.408666	0.490192
2.05	0.206849	0.240191	0.278246	0.299532	4.55	0.233024	0.304182	0.411807	0.495848
2.1	0.20782	0.241842	0.280854	0.302767	4.6	0.233298	0.305303	0.414985	0.501657
2.15	0.208759	0.243462	0.283443	0.305998	4.65	0.233566	0.306423	0.418202	0.507628
2.2	0.209666	0.245054	0.286017	0.309226	4.7	0.233829	0.307542	0.421459	0.513774
2.25	0.210543	0.246619	0.288576	0.312453	4.75	0.234087	0.30866	0.424758	0.520109
2.3	0.211392	0.248159	0.291123	0.315683	4.8	0.23434	0.309778	0.4281	0.526646
2.35	0.212214	0.249674	0.293659	0.318916	4.85	0.234589	0.310896	0.431487	0.533405
2.4	0.21301	0.251166	0.296185	0.322155	4.9	0.234834	0.312013	0.434921	0.540404
2.45	0.213782	0.252636	0.298704	0.325402	4.95	0.235074	0.31313	0.438403	0.547666
					5	0.23531	0.314247	0.441936	0.555218

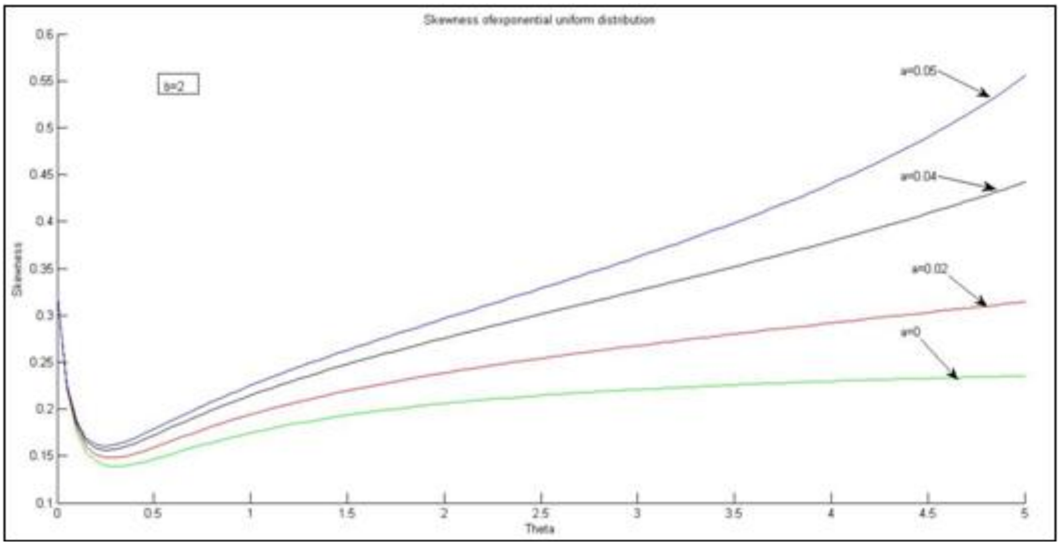

Figure 3

The kurtosis of T-X distributions are computed using (2.9) for b=2 ,a= 0,0.002, 0.004, 0.006 and various values of θ and they are given in the Table-4. These are show graphically in the Fig.4. It is observed that the values of kurtosis are increasing with increase in θ.

Table 4: The Kurtosis values of T-X distribution

θ	a				θ	a			
	0	0.002	0.004	0.006		0	0.002	0.004	0.006
0	2.156972	2.156972	2.156972	2.156972	5	1.963928	1.990324	2.019696	2.052665
0.1	1.964038	1.964918	1.9658	1.966683	5.1	1.964513	1.991448	2.02149	2.055304
0.2	1.909163	1.910732	1.912305	1.913883	5.2	1.96508	1.992555	2.023272	2.057941
0.3	1.889817	1.891986	1.894165	1.896354	5.3	1.965629	1.993645	2.025041	2.060576

0.4	1.883524	1.88625	1.888993	1.891753	5.4	1.966162	1.99472	2.0268	2.063211
0.5	1.882851	1.886109	1.889394	1.892706	5.5	1.966678	1.99578	2.028548	2.065846
0.6	1.88478	1.888556	1.892371	1.896226	5.6	1.967179	1.996825	2.030287	2.068483
0.7	1.887928	1.892214	1.896552	1.900945	5.7	1.967665	1.997858	2.032018	2.071121
0.8	1.891612	1.896402	1.901261	1.90619	5.8	1.968137	1.998877	2.03374	2.073763
0.9	1.895477	1.900769	1.906147	1.911615	5.9	1.968595	1.999884	2.035455	2.076409
1	1.899338	1.905129	1.911027	1.917036	6	1.969041	2.000879	2.037163	2.07906
1.1	1.903095	1.909384	1.915803	1.922356	6.1	1.969474	2.001863	2.038864	2.081717
1.2	1.906698	1.913485	1.920426	1.927528	6.2	1.969895	2.002837	2.04056	2.08438
1.3	1.910125	1.917409	1.924875	1.93253	6.3	1.970305	2.0038	2.042251	2.087049
1.4	1.913367	1.92115	1.929143	1.937357	6.4	1.970704	2.004753	2.043938	2.089727
1.5	1.916427	1.924708	1.933231	1.942009	6.5	1.971092	2.005698	2.04562	2.092413
1.6	1.91931	1.92809	1.937146	1.946494	6.6	1.97147	2.006633	2.047299	2.095108
1.7	1.922026	1.931306	1.940898	1.95082	6.7	1.971839	2.00756	2.048974	2.097813
1.8	1.924583	1.934364	1.944496	1.954999	6.8	1.972198	2.008479	2.050647	2.100529
1.9	1.926993	1.937276	1.94795	1.959041	6.9	1.972548	2.00939	2.052317	2.103255
2	1.929266	1.940052	1.951271	1.962956	7	1.97289	2.010294	2.053985	2.105993
2.1	1.931411	1.9427	1.954469	1.966754	7.1	1.973223	2.011191	2.055652	2.108744
2.2	1.933437	1.945231	1.957553	1.970445	7.2	1.973548	2.012081	2.057317	2.111507
2.3	1.935353	1.947653	1.960531	1.974036	7.3	1.973865	2.012964	2.058981	2.114284
2.4	1.937167	1.949974	1.963412	1.977537	7.4	1.974175	2.013842	2.060645	2.117075
2.5	1.938886	1.952202	1.966203	1.980955	7.5	1.974477	2.014713	2.062308	2.119881
2.6	1.940517	1.954342	1.968911	1.984297	7.6	1.974773	2.015579	2.063971	2.122702
2.7	1.942067	1.956402	1.971542	1.987568	7.7	1.975062	2.016439	2.065635	2.125538
2.8	1.94354	1.958386	1.974101	1.990776	7.8	1.975344	2.017294	2.0673	2.128392
2.9	1.944942	1.960301	1.976594	1.993924	7.9	1.97562	2.018144	2.068965	2.131262
3	1.946278	1.962151	1.979027	1.997019	8	1.97589	2.018989	2.070631	2.134149
3.1	1.947553	1.963941	1.981402	2.000065	8.1	1.976154	2.01983	2.072299	2.137055
3.2	1.948769	1.965673	1.983725	2.003065	8.2	1.976412	2.020666	2.073968	2.139979
3.3	1.949932	1.967353	1.985999	2.006024	8.3	1.976665	2.021498	2.07564	2.142922
3.4	1.951044	1.968984	1.988227	2.008946	8.4	1.976912	2.022326	2.077313	2.145886
3.5	1.952109	1.970568	1.990413	2.011833	8.5	1.977154	2.023151	2.078989	2.148869
3.6	1.953129	1.972109	1.99256	2.014689	8.6	1.977392	2.023971	2.080667	2.151874
3.7	1.954107	1.973609	1.99467	2.017516	8.7	1.977624	2.024788	2.082349	2.154899
3.8	1.955046	1.975071	1.996746	2.020318	8.8	1.977852	2.025602	2.084033	2.157947
3.9	1.955947	1.976497	1.99879	2.023096	8.9	1.978075	2.026413	2.085721	2.161018
4	1.956814	1.977889	2.000805	2.025852	9	1.978293	2.02722	2.087412	2.164112
4.1	1.957648	1.97925	2.002791	2.02859	9.1	1.978508	2.028025	2.089106	2.167229
4.2	1.95845	1.98058	2.004752	2.031311	9.2	1.978718	2.028826	2.090805	2.170371
4.3	1.959223	1.981882	2.006689	2.034017	9.3	1.978924	2.029625	2.092508	2.173538
4.4	1.959968	1.983158	2.008604	2.036709	9.4	1.979126	2.030422	2.094215	2.17673
4.5	1.960687	1.984408	2.010497	2.039389	9.5	1.979324	2.031216	2.095926	2.179949
4.6	1.96138	1.985634	2.012371	2.042059	9.6	1.979519	2.032008	2.097642	2.183194
4.7	1.96205	1.986837	2.014227	2.044721	9.7	1.97971	2.032797	2.099363	2.186467
4.8	1.962697	1.988019	2.016065	2.047374	9.8	1.979897	2.033585	2.101088	2.189768
4.9	1.963322	1.989181	2.017888	2.050022	9.9	1.980081	2.03437	2.102819	2.193098
					10	1.980262	2.035153	2.104556	2.196457

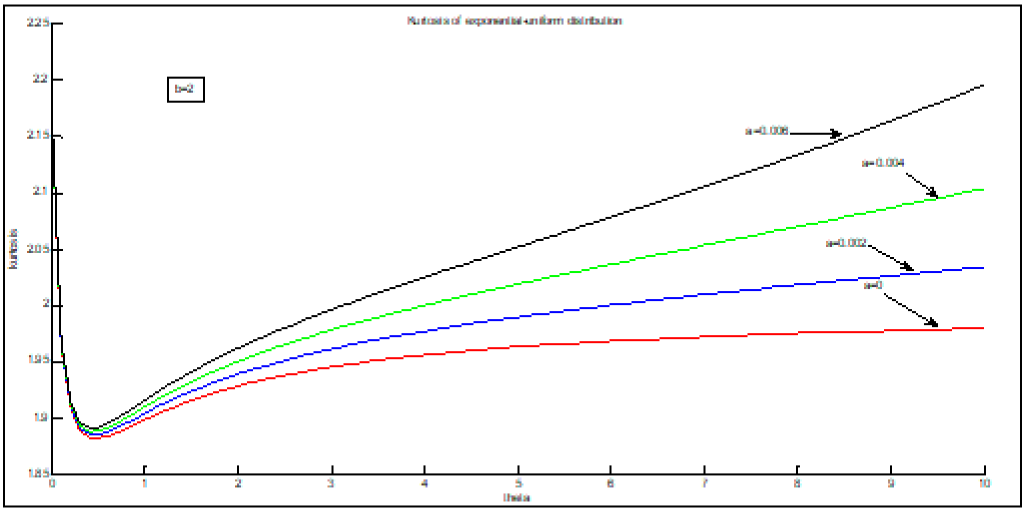

Figure 4

The skewness of T-X distributions are computed using (2.9) for b=0.05,b=2,4.6,10 for various values of θ and they are given in the Table-5. These are show graphically in the Fig.5. It is observed that the values of skewness are decreasing with increase in b values..

Table 5: The skewness values of T-X distribution

θ	b				θ	b			
	2	4	6	10		2	4	6	10
0	0.324701	0.324701	0.324701	0.324701	0.255	0.342165	0.328881	0.324577	0.321177
0.005	0.315137	0.313318	0.312714	0.312231	0.26	0.345305	0.332068	0.32778	0.324392
0.01	0.306962	0.30359	0.302473	0.301581	0.265	0.348487	0.3353	0.331027	0.327651
0.015	0.29998	0.295275	0.29372	0.29248	0.27	0.351712	0.338576	0.334319	0.330955
0.02	0.29403	0.288175	0.286243	0.284704	0.275	0.35498	0.341896	0.337655	0.334304
0.025	0.288977	0.282125	0.279868	0.278073	0.28	0.358291	0.345261	0.341036	0.337698
0.03	0.284709	0.276988	0.27445	0.272432	0.285	0.361646	0.348671	0.344463	0.341138
0.035	0.281128	0.27265	0.269867	0.267656	0.29	0.365045	0.352126	0.347936	0.344624
0.04	0.278155	0.269013	0.266016	0.263637	0.295	0.368489	0.355627	0.351455	0.348157
0.045	0.275719	0.265994	0.26281	0.260284	0.3	0.371979	0.359175	0.355021	0.351737
0.05	0.273761	0.263522	0.260175	0.25752	0.305	0.375515	0.36277	0.358635	0.355365
0.055	0.272228	0.261537	0.258045	0.255277	0.31	0.379098	0.366414	0.362297	0.359042
0.06	0.271075	0.259985	0.256367	0.2535	0.315	0.382729	0.370107	0.366009	0.362769
0.065	0.270265	0.258822	0.255092	0.252137	0.32	0.38641	0.37385	0.369771	0.366547
0.07	0.269762	0.258007	0.254178	0.251146	0.325	0.390141	0.377644	0.373585	0.370376
0.075	0.269537	0.257506	0.25359	0.25049	0.33	0.393924	0.381491	0.377452	0.374259
0.08	0.269563	0.257288	0.253296	0.250136	0.335	0.397759	0.385392	0.381374	0.378195
0.085	0.269818	0.257327	0.253267	0.250055	0.34	0.401649	0.389348	0.38535	0.382188
0.09	0.270281	0.2576	0.25348	0.250221	0.345	0.405595	0.393361	0.389384	0.386239
0.095	0.270933	0.258084	0.253911	0.250612	0.35	0.409598	0.397432	0.393477	0.390348
0.1	0.271759	0.258762	0.254544	0.251208	0.355	0.41366	0.401564	0.397631	0.394518
0.105	0.272744	0.259618	0.255359	0.251992	0.36	0.417784	0.405758	0.401847	0.398751
0.11	0.273876	0.260636	0.256342	0.252948	0.365	0.421971	0.410016	0.406127	0.403049
0.115	0.275142	0.261804	0.25748	0.254062	0.37	0.426224	0.414341	0.410474	0.407414
0.12	0.276534	0.26311	0.258759	0.255322	0.375	0.430544	0.418735	0.414891	0.411848
0.125	0.278041	0.264544	0.260171	0.256716	0.38	0.434935	0.4232	0.419379	0.416355
0.13	0.279655	0.266097	0.261704	0.258234	0.385	0.439398	0.427739	0.423942	0.420936
0.135	0.28137	0.267759	0.263351	0.259868	0.39	0.443938	0.432355	0.428582	0.425595
0.14	0.283178	0.269524	0.265102	0.26161	0.395	0.448556	0.437051	0.433303	0.430334
0.145	0.285074	0.271385	0.266953	0.263452	0.4	0.453257	0.441831	0.438107	0.435158
0.15	0.287052	0.273336	0.268895	0.265388	0.405	0.458043	0.446698	0.442999	0.44007
0.155	0.289107	0.27537	0.270924	0.267412	0.41	0.462919	0.451656	0.447983	0.445073
0.16	0.291236	0.277485	0.273034	0.269519	0.415	0.467889	0.456709	0.453062	0.450172
0.165	0.293433	0.279674	0.275221	0.271704	0.42	0.472957	0.461861	0.458241	0.455373
0.17	0.295696	0.281934	0.27748	0.273963	0.425	0.478129	0.467119	0.463526	0.460678
0.175	0.298022	0.284262	0.279809	0.276292	0.43	0.483408	0.472487	0.468921	0.466095
0.18	0.300407	0.286654	0.282203	0.278688	0.435	0.488803	0.47797	0.474433	0.471629
0.185	0.30285	0.289107	0.28466	0.281148	0.44	0.494317	0.483576	0.480068	0.477286
0.19	0.305347	0.291619	0.287176	0.283669	0.445	0.49996	0.489312	0.485833	0.483074
0.195	0.307898	0.294188	0.289751	0.286248	0.45	0.505737	0.495184	0.491736	0.489001
0.2	0.310499	0.296811	0.292381	0.288883	0.455	0.511657	0.501203	0.497785	0.495074
0.205	0.31315	0.299487	0.295065	0.291573	0.46	0.517731	0.507376	0.50399	0.501304
0.21	0.31585	0.302214	0.2978	0.294315	0.465	0.523967	0.513715	0.510361	0.507701
0.215	0.318596	0.30499	0.300587	0.297109	0.47	0.530378	0.520232	0.516911	0.514277
0.22	0.321388	0.307816	0.303422	0.299952	0.475	0.536977	0.526939	0.523653	0.521045
0.225	0.324226	0.310688	0.306306	0.302845	0.48	0.543778	0.533852	0.530601	0.528021
0.23	0.327108	0.313607	0.309237	0.305785	0.485	0.550798	0.540987	0.537773	0.535222
0.235	0.330033	0.316573	0.312214	0.308772	0.49	0.558056	0.548364	0.545188	0.542667
0.24	0.333002	0.319583	0.315237	0.311805	0.495	0.565573	0.556006	0.552869	0.550379
0.245	0.336014	0.322638	0.318306	0.314884	0.5	0.573377	0.563938	0.560842	0.558384
0.25	0.339068	0.325737	0.321419	0.318008					

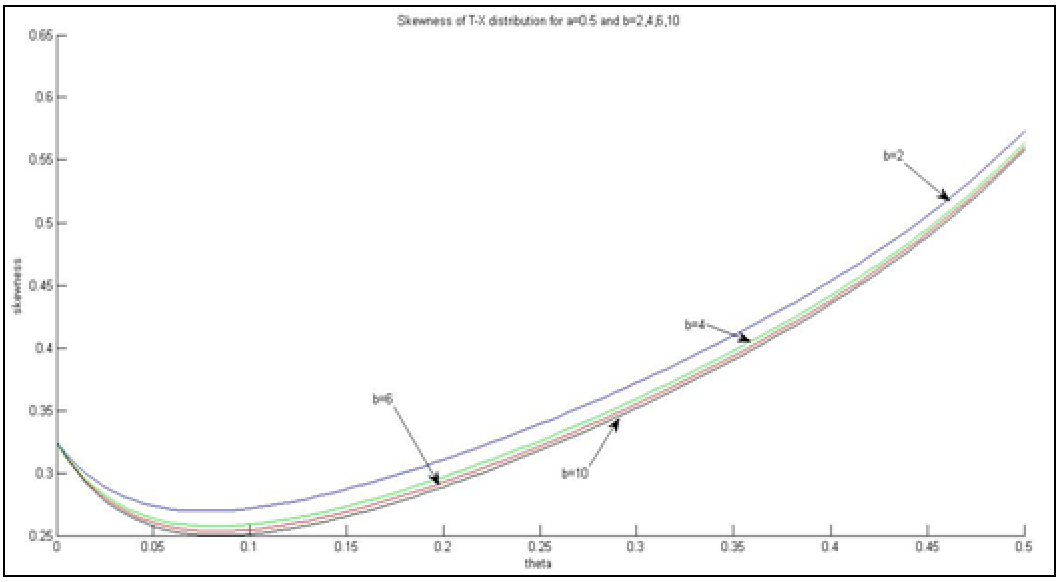

Figure 5

References

[1] Marsall, A.N. and Olkin (1997) A new method for adding a parameter to a family of distributions with applications to the exponential and Weilbul families. Biometrika, 84,641-652.
[2] Eugene, N., Lee, C and Famoye, F.(2002) Beta-normal distribution and its applications, Communications in Statistics-Theory and Methods, 31,175-195.
[3] Corderio, G.M. and de Castro, M (2011) A new family of generalized distributions, Journal of Statistical Computation and Simulation, 81, 883-893.
[4] Alaxander. C.,Cordeiro, G.M. Ortege, E.M.M. and Sarabia J.M. (2012) Generalized beta-generated distributions, computationalStatistics and data Analysis,56, 1860-1897
[5] Alzaatreh A, Lee C , Famoye, F (2013) A new method for generating families of distributions,Metron,71,63-79.
[6] Bourgnignon,M,Silva,R.B.,Cordeiro,G.M.(2014) The WeilbulG family of probability distributions ,Journal of data sciences,12,53-68.
[7] Corderio, G.M,Allzadeh, M and Orfega,E,M.M. The exponentiated Half-Logistic Family of distributions, properties and applications, Journal of probability and statistics, vol.2014, Article ID 864396,21 pges,2014,doi10.1155/2014/864396.
[8] Johnson.N.L., Kotz, S,Balakrishnan, N, Continuous Univariate distributions, vol. 1,.2nd ede. Wiely.New York (1994).
[9] Galton, F., Enquiries into Human Faculty and its Development, Macmillan& Company, London(1881).
[10] Moors, J.J., A quantile alternative for kurtosis, Statistician, 37, 25-32(1988).