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A Novel Way for Area Computation of Browser Sharing Phenomena through Implementation of Simpson's 1/3 Method

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Abstract: An Internet browser is a rapidly developing technology, which has carried substantial changes and opportunities to numerous zone. Modern web browsers afford various supportive features and mostly utilize for revealing and accessing websites on the Internet. Shukla and Singhai (2011) need special mention as they have developed a browser sharing phenomenon. Mainly, when two browsers installed in a computer system, also produces a mathematical relationship between browser sharing and browser failure probability. However, These expressions comprises of probability based quadric form having definite bounded area and contain a several information about browsing sharing prospect where estimation is a necessity , but direct integration method is delinquent for estimation purpose. Moreover, Present study is an attempt to afford an overview on a procedure of estimation for bounded area lying under the curve with the help of Simpson's 1/3 rule. This will offer favorable circumstances for estimation procedure and display direct relationship between browser share and browser failure probability.

***Keywords:** Browser Sharing, Browser Failure Probability, Simpson's 1/3 rule, Numerical Quadratic.*

I. INTRODUCTION

In recent years web browsers appear to be growing and have increasingly been discussed, a variety of web browsers exist with diverse features, look-and-feel, and designed to run on different operating system surroundings. A model based pioneering contribution of Shukla and Singhai (2011) proposes that browser sharing expression is a function of many parameters and contained many information regarding its associated parameter. This browser share expression is a quadratic form of probability based parameters along with bounded area like browser failure probability, quitting probability, initial preferences *etc.*, with their inter relationship with quality of service. Owing to the complexity of these expression, estimation of bounded area become problematic. The direct integration method is very burdensome and not found ample for estimation. The foremost objectives are:

(1) To estimate bounded area of browser share curve.
(2) To determine relationship between browsing sharing and browser failure probability.
(3) To utilized Simpson 1/3 rule for area estimation.

This paper reflects a procedure of estimation of browser sharing phenomenon by using Simpson 1/3 rule commonly used in numerical analysis. Similar contribution is also given due to [3],[8],[13], [17] and [18].

II. LITERATURE REVIEW

A performance study for multicast switching with different traffics has been proposed by Hambali and Ramani (2002) whereas Naldi (2002) discussed internet traffic sharing analysis of operators and derived some expression on it. Gangele and Dongre (2014) focused on probability density estimation function for browser share curve for the clarification of web browsing behaviour of users. Shukla, Verma and Gangele (2012) utilized markov chain model for Iso-failure analysis as well as curve fitting analysis in case of multi operator environment. Dorea, Cruz and Rojas (2004) suggested some approximation results for non-homogeneous markov chains and develop some applications on it. Shukla *et al.*(2011) examined the effect of elasticity and index analysis for usual internet traffic share problem and functional relationship were discussed. Shukla, Verma and Gangele (2012) presented a least square fitting applications in case of rest state environment in internet traffic sharing scenario. Gangele and Dongre (2014) suggested a two-call index based internet traffic sharing analysis in case of cyber crime environment for a computer network system, while Gangele and Shukla (2014) discussed an area computation of internet traffic share problem with special reference to cyber crime environment and derived some new result. Naldi (1998) initiated a study which is based on internet growth problems. One more contribution was given by Shuka *et al.*(2011) for elasticity analysis of internet traffic distribution in a computer network in a particular case of two-market environment of users. Newby and Dagg (2002) conducted a study on optical inspection and maintenance for stochastically deteriorating systems and an average cost criteria were studded. Gangele (2014) utilized an application of numerical method for area estimation towards conjunction control of internet traffic sharing with the help of Simpson 1/3 rule. Gangele and Patil (2015) explored a model based internet traffic distribution analysis in case of multi-operator and multi-market environment and suggested few novel results. Shukla and Singhai (2011) advocate and analyzed user web browsing behaviour through markov chain model and also derived Iso share expression on it. Shukla, Verma and Gangele (2011) explored a model based study for re-attempt connectivity to internet analysis of user and discuss some network parameter and there relations with traffic share of operators. Similar contribution were performed by Shukla *et al.*(2015) for the analysis of bounded area estimation of traffic share scenario with the help of Simpson 3/8 rule of numerical analysis. Shukla, Verma and Gangele (2015) have given a methodology for approximating the probability of traffic sharing through numerical analysis techniques when two operators are in competitive mode. Sastry(2012) discussed a fundamental concept of numerical methods and its application in various fields.

III. SIMPSION 1/3 METHOD

Let y = f(x) be a function to be integrated in the range a to b (a < b). Using functional relationship, we can write n different discrete values of x in range a - b, and can write different y using y=f (x) as below:

x: $x_0, x_1, x_2 \ldots x_n$

y: $y_0, y_1, y_2 \ldots y_n$; (i=1,2,3...n) ;

Where $a = x_0 < x_1 < x_2 < x_3 \ldots < x_n = b$ and differencing $h = (x_{i+1} - x_i)$ is like equal interval.

$$I = \int_b^a f(x)dx = \int_b^a y\,dx = \frac{h}{3}\begin{bmatrix} \begin{pmatrix} y_0 \\ +y_n \end{pmatrix} + 4\begin{pmatrix} y_1 + y_3 \\ +\ldots \\ +y_{n-1} \end{pmatrix} \\ +2\begin{pmatrix} y_2 + y_4 \\ +\ldots \\ +y_{n-2} \end{pmatrix} \end{bmatrix} \ldots(3.1)$$

This is known as Simpson 1/3 ^{ed} rule of Integration used in numerical analysis.

IV. USEFULNESS OF SIMPSION 1/3^{ED} METHOD

We take the followings for (3.1), and consider $\overline{B}_1 = f(b_j)$, j=1,2 and assume

X = Browser share probability(b_1) or (b_2) for browser B_1 or B_2 respectively.

Y = Browser sharing is equal to $\overline{B}_1$.

And want to evaluate the following integral *(as suggested by Shukla and Singhai (2011))* in the limit 0 to l where l=0 and u=1 are the constraints:

$$I = \int_l^u f(b_1)db_1 = \int_l^u \left[\frac{(1-b_1)(1-p_C)\{p+(1-p)(1-p_q)b_2\}}{1-b_1 b_2 (1-p_q)^2}\right] db_1 \quad \ldots(4.1)$$

TABLE 1-[For Figure 1 Where (P =0.35, P_q= 0.20, p_c = 0.15, h=0.05)]									
b_2	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
b_1	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$
0	0.3417	0.3859	0.4301	0.4743	0.5185	0.5627	0.6069	0.6511	0.6953
0.05	0.3257	0.369	0.4126	0.4564	0.5006	0.545	0.5898	0.6348	0.6801
0.1	0.3095	0.3518	0.3947	0.4381	0.4821	0.5267	0.5718	0.6176	0.664
0.15	0.2933	0.3344	0.3764	0.4193	0.4629	0.5075	0.553	0.5995	0.6469
0.2	0.2769	0.3168	0.3578	0.3999	0.4432	0.4876	0.5333	0.5803	0.6287
0.25	0.2604	0.299	0.3388	0.3800	0.4227	0.4668	0.5126	0.5600	0.6092
0.3	0.2439	0.2809	0.3195	0.3596	0.4015	0.4452	0.4908	0.5385	0.5884
0.35	0.2272	0.2626	0.2997	0.3386	0.3795	0.4225	0.4678	0.5156	0.5661
0.4	0.2104	0.244	0.2795	0.3170	0.3568	0.3989	0.4436	0.4913	0.5421
0.45	0.1935	0.2252	0.2589	0.2948	0.3331	0.3741	0.4181	0.4653	0.5162
0.5	0.1765	0.2061	0.2379	0.272	0.3086	0.3482	0.391	0.4376	0.4883
0.55	0.1594	0.1868	0.2164	0.2484	0.2832	0.321	0.3624	0.4078	0.458
0.6	0.1421	0.1672	0.1944	0.2241	0.2567	0.2925	0.332	0.3759	0.425
0.65	0.1248	0.1473	0.172	0.1991	0.2291	0.2625	0.2997	0.3416	0.389
0.7	0.1073	0.1272	0.1491	0.1734	0.2005	0.2309	0.2653	0.3044	0.3495
0.75	0.0897	0.1067	0.1256	0.1468	0.1706	0.1976	0.2285	0.2642	0.306
0.8	0.072	0.086	0.1016	0.1193	0.1394	0.1624	0.1892	0.2206	0.2579
0.85	0.0542	0.065	0.0771	0.0909	0.1068	0.1253	0.147	0.1729	0.2043
0.9	0.0363	0.0436	0.052	0.0616	0.0728	0.086	0.1017	0.1208	0.1444
0.95	0.0182	0.022	0.0263	0.0313	0.0372	0.0443	0.0528	0.0634	0.0768
AREA(A)=	**0.1738**	**0.2008**	**0.2292**	**0.2591**	**0.29078**	**0.3245**	**0.3605**	**0.3993**	**0.4413**

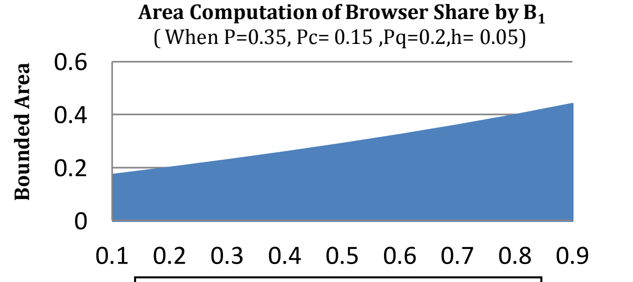

Figure1 -Variation Over b_2

In view of fig. 1 its seems that the rate of growth of bounded area is from18% to nearly 45% growth with quitting probability p_q= 20% with some increasing browser failure probability by 10%.

TABLE 2 -[For Figure 2 Where (b_2 =0.45, P_q= 0.25, p_c = 0.3, h=0.05)]

P	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
b_1	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$
0	0.2826	0.329	0.3754	0.4218	0.4681	0.5145	0.5609	0.6073	0.6536
0.05	0.2719	0.3166	0.3612	0.4058	0.4504	0.495	0.5397	0.5843	0.6289
0.1	0.261	0.3038	0.3466	0.3894	0.4323	0.4751	0.5179	0.5607	0.6035
0.15	0.2497	0.2907	0.3317	0.3726	0.4136	0.4546	0.4956	0.5365	0.5775
0.2	0.2382	0.2772	0.3163	0.3554	0.3945	0.4335	0.4726	0.5117	0.5508
0.25	0.2263	0.2634	0.3006	0.3377	0.3748	0.4119	0.4491	0.4862	0.5233
0.3	0.2141	0.2492	0.2844	0.3195	0.3546	0.3897	0.4249	0.4600	0.4951
0.35	0.2016	0.2346	0.2677	0.3008	0.3339	0.3669	0.4000	0.4331	0.4662
0.4	0.1887	0.2196	0.2506	0.2816	0.3125	0.3435	0.3744	0.4054	0.4364
0.45	0.1754	0.2042	0.2330	0.2618	0.2906	0.3194	0.3481	0.3769	0.4057
0.5	0.1618	0.1883	0.2149	0.2414	0.268	0.2945	0.3211	0.3476	0.3742
0.55	0.1478	0.172	0.1962	0.2205	0.2447	0.2690	0.2932	0.3175	0.3417
0.6	0.1333	0.1552	0.177	0.1989	0.2208	0.2427	0.2645	0.2864	0.3083
0.65	0.1184	0.1378	0.1573	0.1767	0.1961	0.2155	0.2350	0.2544	0.2738
0.7	0.103	0.12	0.1369	0.1538	0.1707	0.1876	0.2045	0.2214	0.2383
0.75	0.0872	0.1015	0.1158	0.1301	0.1445	0.1588	0.1731	0.1874	0.2017
0.8	0.0709	0.0825	0.0941	0.1058	0.1174	0.129	0.1407	0.1523	0.1639
0.85	0.054	0.0629	0.0717	0.0806	0.0895	0.0983	0.1072	0.1161	0.1249
0.9	0.0366	0.0426	0.0486	0.0546	0.0606	0.0666	0.0726	0.0786	0.0846
0.95	0.0186	0.0217	0.0247	0.0278	0.0308	0.0339	0.0369	0.0400	0.043
AREA(A)=	**0.1542**	**0.1795**	**0.2048**	**0.2301**	**0.2554**	**0.2807**	**0.306**	**0.3313**	**0.3566**

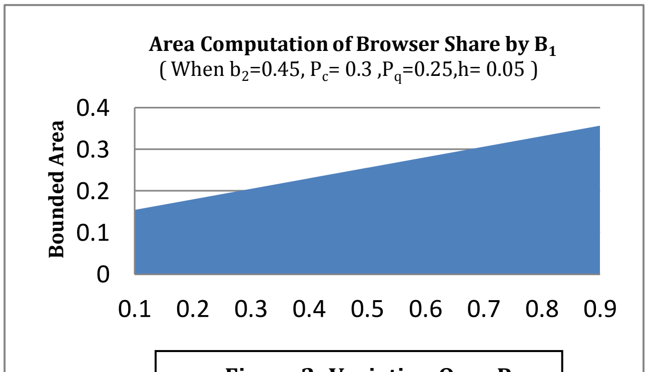

Figure 2 -Variation Over P

In light of fig. 2 it is observed that with variation of p, the development of bounded area is rises with 18% and endup with 38 % at maximum increment of p value for browser failure probability b_2 by 45%.

TABLE 3-[For Figure 3 Where (b_2 =0.05, P= 0.25, p_q= 0.45, h=0.05)]									
Pc	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
b_1	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$
0	0.2436	0.2165	0.1894	0.1624	0.1353	0.1083	0.0812	0.0541	0.0271
0.05	0.2316	0.2058	0.1801	0.1544	0.1286	0.1029	0.0772	0.0515	0.0257
0.1	0.2195	0.1951	0.1708	0.1464	0.122	0.0976	0.0732	0.0488	0.0244
0.15	0.2075	0.1844	0.1614	0.1383	0.1153	0.0922	0.0692	0.0461	0.0231
0.2	0.1954	0.1737	0.152	0.1303	0.1086	0.0869	0.0651	0.0434	0.0217
0.25	0.1834	0.163	0.1426	0.1222	0.1019	0.0815	0.0611	0.0407	0.0204
0.3	0.1713	0.1522	0.1332	0.1142	0.0952	0.0761	0.0571	0.0381	0.019
0.35	0.1592	0.1415	0.1238	0.1061	0.0884	0.0707	0.0531	0.0354	0.0177
0.4	0.147	0.1307	0.1144	0.098	0.0817	0.0653	0.049	0.0327	0.0163
0.45	0.1349	0.1199	0.1049	0.0899	0.0749	0.0599	0.0450	0.0300	0.015
0.5	0.1227	0.1091	0.0954	0.0818	0.0682	0.0545	0.0409	0.0273	0.0136
0.55	0.1105	0.0982	0.086	0.0737	0.0614	0.0491	0.0368	0.0246	0.0123
0.6	0.0983	0.0874	0.0765	0.0655	0.0546	0.0437	0.0328	0.0218	0.0109
0.65	0.0861	0.0765	0.067	0.0574	0.0478	0.0383	0.0287	0.0191	0.0096
0.7	0.0739	0.0656	0.0574	0.0492	0.041	0.0328	0.0246	0.0164	0.0082
0.75	0.0616	0.0547	0.0479	0.0411	0.0342	0.0274	0.0205	0.0137	0.0068
0.8	0.0493	0.0438	0.0384	0.0329	0.0274	0.0219	0.0164	0.011	0.0055
0.85	0.037	0.0329	0.0288	0.0247	0.0206	0.0164	0.0123	0.0082	0.0041
0.9	0.0247	0.0219	0.0192	0.0165	0.0137	0.011	0.0082	0.0055	0.0027
0.95	0.0124	0.011	0.0096	0.0082	0.0069	0.0055	0.0041	0.0027	0.0014
AREA(A)=	**0.1219**	**0.1083**	**0.0948**	**0.0812**	**0.0677**	**0.0542**	**0.0406**	**0.0271**	**0.0135**

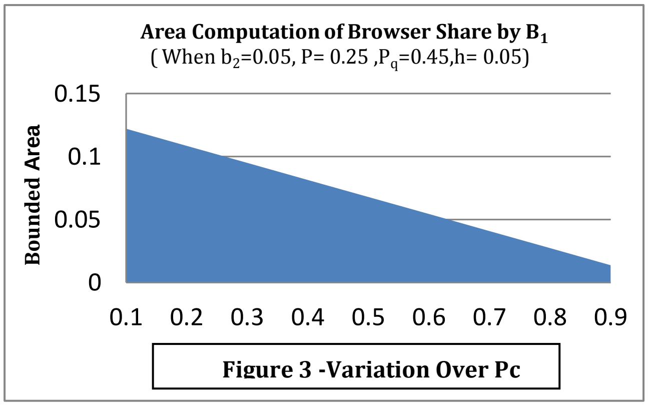

Fig. 3 related to table no.3, reflect that linear decreasing pattern arises when p_q=45 %, p=25% and browser failure probability b_2=5%. The minimum bounded area is 2% and maximum bounded area is 13% for constant parameters.

TABLE 4-[For Figure 4 Where (b_2 =0.35, P= 0.45, p_c= 0.15, h=0.05)]

P_q	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
b_1	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$	$\overline{B}_1$
0	0.5298	0.5134	0.497	0.4807	0.4643	0.448	0.4316	0.4152	0.3989
0.05	0.5105	0.4933	0.4763	0.4595	0.443	0.4267	0.4107	0.3947	0.3790
0.1	0.4907	0.4726	0.4551	0.4381	0.4216	0.4054	0.3897	0.3742	0.3591
0.15	0.4703	0.4516	0.4336	0.4164	0.3999	0.384	0.3686	0.3537	0.3392
0.2	0.4493	0.43	0.4118	0.3945	0.3781	0.3624	0.3475	0.3331	0.3193
0.25	0.4276	0.4079	0.3895	0.3722	0.356	0.3407	0.3263	0.3125	0.2994
0.3	0.4053	0.3853	0.3668	0.3497	0.3338	0.3189	0.305	0.2919	0.2795
0.35	0.3823	0.3621	0.3437	0.3269	0.3113	0.297	0.2837	0.2712	0.2596
0.4	0.3585	0.3384	0.3202	0.3037	0.2887	0.2749	0.2623	0.2505	0.2397
0.45	0.334	0.314	0.2962	0.2803	0.2658	0.2527	0.2408	0.2298	0.2197
0.5	0.3086	0.2891	0.2718	0.2565	0.2428	0.2304	0.2192	0.2091	0.1998
0.55	0.2824	0.2635	0.247	0.2324	0.2195	0.208	0.1976	0.1883	0.1798
0.6	0.2553	0.2372	0.2216	0.2080	0.196	0.1854	0.176	0.1675	0.1599
0.65	0.2273	0.2103	0.1958	0.1832	0.1723	0.1627	0.1542	0.1467	0.1399
0.7	0.1983	0.1827	0.1695	0.1582	0.1484	0.1399	0.1324	0.1258	0.1200
0.75	0.1682	0.1543	0.1426	0.1327	0.1242	0.1169	0.1105	0.1049	0.1000
0.8	0.137	0.1251	0.1152	0.1069	0.0999	0.0938	0.0885	0.084	0.0800
0.85	0.1047	0.0951	0.0873	0.0807	0.0752	0.0706	0.0665	0.063	0.0600
0.9	0.0711	0.0643	0.0588	0.0542	0.0504	0.0472	0.0444	0.0421	0.0400
0.95	0.0363	0.0326	0.0297	0.0273	0.0253	0.0237	0.0222	0.021	0.0200
AREA(A)=	**0.2926**	**0.2769**	**0.2628**	**0.2499**	**0.2381**	**0.2272**	**0.2171**	**0.2077**	**0.1988**

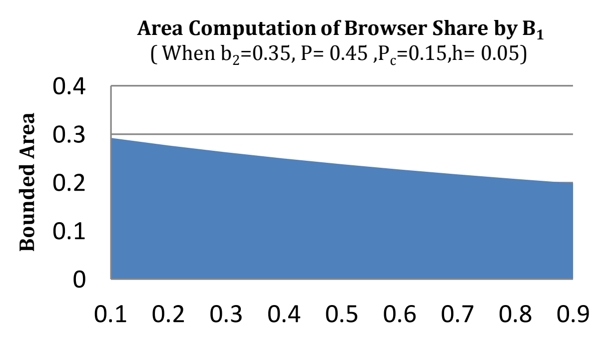

Figure 4-Variation Over Pq

$\overline{B}_1$ pattern over the variation of p_q is down ward side. Lowest area found to be 22% and highest is 29 % for constant parameter p_C =15 %,p=45 % and b_2=35%.

V. RESULT AND DISCUSSION

In an effort to examine the growth of bounded area, we have utilized the functional relationship between browser share and browser failure probability. Interestingly ,it is observed that in figure 1 the rate of growth of bounded area is from 18% to nearly 45% growth with quitting probability p_q= 20% with some increasing browser failure probability by 10%. Next our attempt was to bring variation in p, which is further exemplify in figure 2, reflects that with variation of p, the development of bounded area is rises with 18% and end up with 38 % at maximum increment of p value for browser failure probability b_2 by 45%. In addition, figure 3 display that linear decreasing pattern take place when p_q =45 %, p=25% and browser failure probability b_2=5%. The minimum bounded area is 2% and maximum bounded area is 13% for constant parameters. Moreover, it is evident in figure 4 that the pattern over the variation of p_q is downward side. Lowest area is found to be 22% and highest is 29% for constant parameter p_c=15%, p=45% and b_2=35 %.This piece of work using Simpson's 1/3 method may serve as effective candidature in establishment of relationship between browser share and browser failure probability

VI. CONCLUTION

In this work browser share curve has been analyzed with the help of Simpson's 1/3 method which display the efficacy for the estimation of bounded area. At times, linear relationship exists between browser share and browser failure probability along with variant parameters. Moreover, Estimated bounded area is directly associated with browser failure probability b_1 and b_2. Model parameters P_c& p_q also reflect their relativity with bounded area and affect the browser share. Browser share and the variation with respect to p_q displays the decreasing pattern when b2= 35%, P=45% & P_c=15%.In addition, It is also observed by the study that utility of Simpson's 1/3 rule is effective for estimation of bounded area and browser share curve at particulars, when b_2=45% and p_q=25%. Maximum development of bounded area was found to be at 38% with the variation in model parameter p.

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