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THE OPTIMAL MODEL FOR PREDICTING ROAD TRAFFIC CONGESTION AT LEKKI/EPE ROAD, LAGOS

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Abstract

This study has developed an optimal mathematical model of road traffic congestion in Lekki/Epe express road, Lagos in Nigeria. The model will consider time dependent arrival process, in order to take into consideration both high and low arrivals. To achieve this, data on vehicular movement will be collected from some sections of Lekki/Epe express way. The data will be modeled using a high performing language (MATLAB) for technical computing. The resulting model will be able to predict the Road Traffic Congestion in the location areas, for effective management and control of traffic gridlocks in those areas.

1. INTRODUCTION

Road traffic congestion, [1] can be defined as the impedance vehicles impose on each other due to the speed flow relationship, in conditions where the use of a transport system approaches its capacity. [2] congestion as the saturation of road network capacity due to regular and irregular reductions in service quality.

The highway traffic conditions across highways in Nigeria are in an extremely bad situation caused by daily congestion and daily accidents. The current highway systems are used for daily commuting, transportation of goods and interstate travels. It is then essential that we profer solutions to these problems or at least suggest ways to alleviate the magnitude of their occurrences.

Road traffic congestions are not static and this has been observed by many authors including [3]

Mobility is crucial to the functionality of cities as it affects their socio-economic activities. It is also a fact that the economic development of a nation is closely linked to its transport system. Hindrance to effective mobility is road traffic congestion, [4] stated that it constitutes about 54.5% of all congestions in the cities. This is as a result of the ever increasing urbanization, human activities and the resultant heavy dependence on road transportation that warrants increase in the number of vehicles of different categories. Of interest also is the difficulty of movements on intercity roads and other major corridors due largely to obstructions such as traffic crashes, broken down vehicles, traffic volume exceeding the road network capacity during busy period like closing hours from jobs, festive seasons and some other major activities. The demand for transport especially in cities in developing countries has been on the increase following the rapid socio-economic growth and development of these countries. Traffic management has been quite poor in many developing countries, despite the growth in transport demand and supply. The resultant traffic congestion has become impediment to our livability.

Queuing models for predicting the stationary number of vehicles in a road link using generating functions techniques to study the Chapman-Kolmogorov equations for the road traffic system produces steady state distribution of the number of vehicles on a road [5] and [6]. The same generating function techniques had been used earlier to obtain the performance measures in a network of queues of varying degrees [7] and [8].

The Lagos – Ibadan express way unarguably is one of the busiest roads in Nigeria. The 127.6 km road was the first intercity dual carriage way in Nigeria. The road was commissioned in August 1978 [9], the road has undergone series of remedial works and rehabilitation but lacked major maintenance since it was constructed about forty years ago. However, the highway is undergoing a total reconstruction costing the federal government of Nigeria a whopping sum of 167 billion naira [9]. The road currently is divided into two sections; the first section is an express way from old toll gate of Oregun motor way/Ikosi, in Lagos state to Shagamu in Ogun State. The length of this section is about 43.6 km. The second section is also an express way from shagamu end in Ogun State to lbadan in Oyo State. The total length of this portion is about 84 km.

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The Lagos- Ibadan express way is one of the most important access roads in Nigeria linking the economic nerve centre of Nigeria to various other states of the Federation. From the Lagos- Shagamu exit, it links the South-East, South-South and middle belt of Nigeria.

On the other hand, from the Ibadan axis it links the Northern parts of Nigeria through Oyo State to Kwara, Niger, Kaduna, Kano, etc. The road plays a significant role in the economic development of Nigeria for movement of goods from the coastal city of Lagos to other States [10].

The major interest is the location of major religious organizations worship centers that attract several hundreds of thousands of worshipers periodically, compounding traffic on the road whenever major activities are taking place at the centers. Such centers include the Camp of the Redeemed Christian Church of God (RCCG) at kilometer 36, the Mountain of Fire Prayer Ministry at kilometer 1, the Deeper Life Ministry at kilometer 32 and Nasrul-Lahi-L-Faith Society of Nigeria (NASFAT), Moslem camp sited at kilometer 20 all in Lagos.

1.2 RESEARCH METHOD

In this study, we used the primary method of data collection to collect all necessary data of number of vehicles at high traffic density area of Lagos/Epe tollgate. These data were collected in the month of October,2018. In addition, we use MATLAB to model the data which requires just some calculus and linear algebra, to determine the "Best Fit" to the data, following the coding method [11].

Table 1: Data collected in week 1

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 – 7am	438	402	374	380	380	281	381
7 – 8am	443	421	386	412	412	262	381
8 – 9am	487	447	456	432	432	300	384
9 – 10am	518	449	461	413	413	331	220
10 – 11am	482	511	471	472	472	281	240
11 – 12pm	477	442	454	454	454	303	231
12 – 1pm	507	492	481	464	464	321	301
1 – 2pm	501	562	516	428	428	301	322
2 – 3pm	568	571	559	430	530	341	311
3 – 4pm	516	592	618	598	598	361	314
4 – 5pm	515	571	515	518	518	381	382
5 – 6pm	501	495	484	491	492	390	421

Table 2 Data collected in week 2

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 – 7am	401	403	401	411	402	201	281
7 – 8am	442	419	392	418	422	283	341
8 – 9am	481	451	398	441	441	292	401
9 – 10am	508	453	450	419	423	321	223
10 – 11am	489	517	411	492	489	289	239
11 – 12pm	487	432	423	455	471	312	235
12 – 1pm	509	496	497	473	469	330	311
1 – 2pm	569	569	518	438	448	321	323
2 – 3pm	517	601	562	518	533	352	317
3 – 4pm	525	599	582	492	541	372	301
4 – 5pm	562	581	518	512	528	392	371
5 – 6pm	581	489	512	501	502	401	417

Table 3: Data collected in week 3

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 – 7am	445	401	384	375	396	301	362
7 – 8am	461	418	390	422	421	338	363
8 – 9am	491	451	461	439	428	351	383
9 – 10am	523	499	472	419	300	300	401
10 – 11am	491	501	409	451	394	289	389
11 – 12pm	492	451	461	453	416	228	411
12 – 1pm	403	481	483	490	309	321	418
1 – 2pm	555	501	526	501	411	309	492
2 – 3pm	507	591	561	495	501	396	398
3 – 4pm	557	601	592	539	543	428	279
4 – 5pm	556	590	562	525	513	478	517
5 – 6pm	515	581	464	503	541	441	581

Table 4: Data collected in week 4

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 – 7am	511	389	401	403	431	263	483
7 – 8am	526	422	399	421	459	318	429
8 – 9am	492	426	452	441	463	329	481
9 – 10am	524	510	473	423	401	301	492
10 – 11am	445	501	471	432	434	300	319
11 – 12pm	482	513	472	461	493	311	317
12 – 1pm	423	501	492	482	418	301	411
1 – 2pm	493	611	533	498	493	395	413
2 – 3pm	511	509	553	498	493	417	219
3 – 4pm	553	593	601	513	513	458	411
4 – 5pm	561	517	603	509	497	421	489
5 – 6pm	525	519	573	538	517	469	493

Table 5: Data collected in week 5

Time	Monday	Tuesday	Wednesday
6 – 7am	419	411	391
7 – 8am	432	421	401
8 – 9am	451	421	444
9 – 10am	403	419	475
10 – 11am	411	101	473
11 – 12pm	422	319	511
12 – 1pm	419	348	509
1 – 2pm	400	440	517
2 – 3pm	473	410	551
3 – 4pm	475	383	552
4 – 5pm	519	533	501
5 – 6pm	516	581	538

1.3 DATA ANALYSIS AND RESULTS

MATLAB software was applied to the data collected for one month (31 days) in Lekki/Epe express way, for this study in conjunction with using equation (1.1) to determine the best fits to the data. The results for the seven days across the 31 days are shown in figures 1 to 7. In addition the goodness of fit test for the data is shown in table 6, which shows a high level of correlation between the actual and predicted values

$$f(x) = a1\sin(b1x+c1) + a2\sin(b2x+c2)+a3\sin(b3x+c3) +a4\sin(b4x+c4) + a5\sin(b5x+c5) + a6\sin(b6x+c6) +a7\sin(b7x+c7) + 8\sin(b8x+c8) \quad (1.1)$$

a,b&c are paramiters

Table 6: Goodness of fit

Days	SSE	R-Square	Adjusted R-Square	RMSE	Accuracy
Mondays	3.988e+004	0.7209	0.5426	32.44	72.1%
Tuesdays	1.271e+005	0.722	0.5443	59.42	72.2%
Wednesdays	2.934e+004	0.8796	0.8027	28.55	88%
Thursdays	1.465e+004	0.8563	0.7186	24.7	85.6%
Fridays	2.612e+004	0.843	0.6926	32.99	84.3%
Saturdays	2.642e+004	0.8506	0.7074	33.18	85.1%
Sundays	5.007e+004	0.8606	0.7269	45.68	86.1%

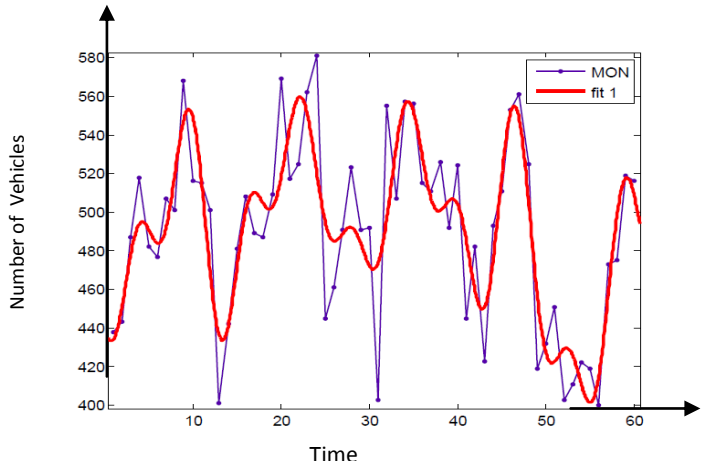

Figure 1 . The graph of all Mondays in the month

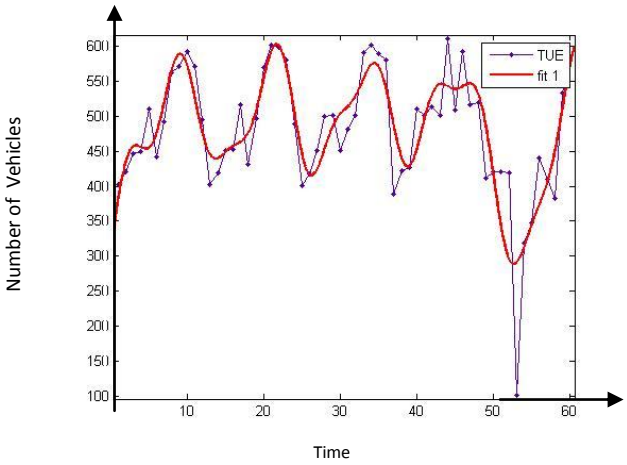

Figure 2 . The graph of all Tuesdays in the month

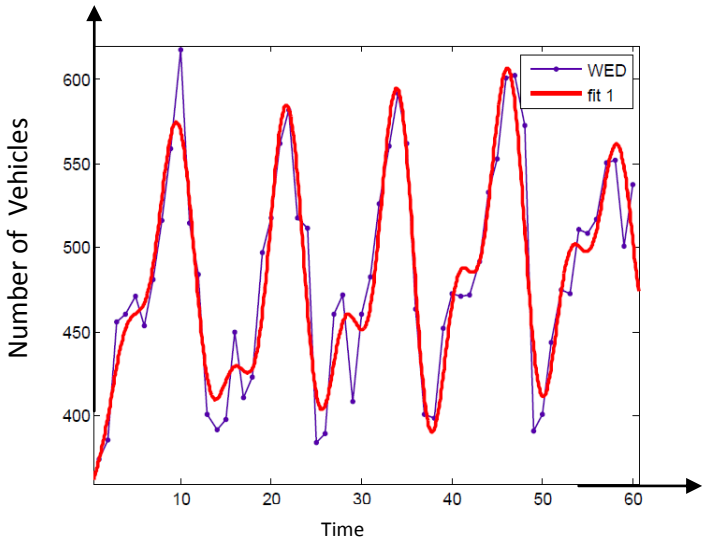

Figure 3 . The graph of all Wednesdays in the month

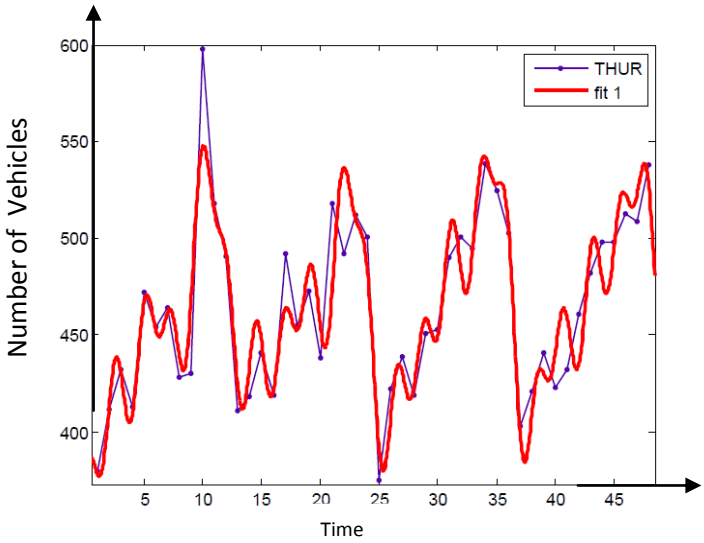

Figure 4 . The graph of all Thursdays in the month

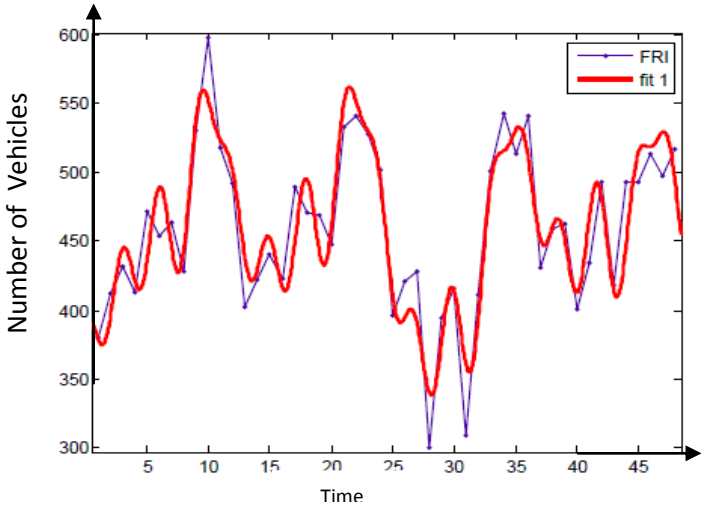

Figure 5 . The graph of all Fridays in the month

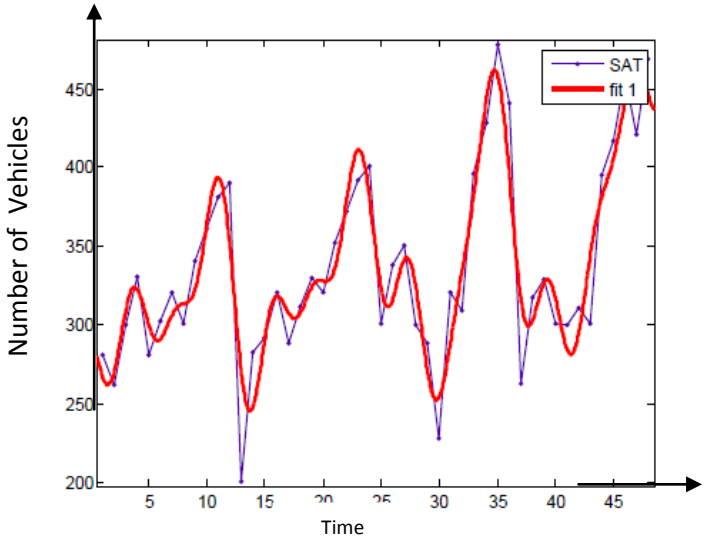

Figure 6 . The graph of all Saturdays in the month

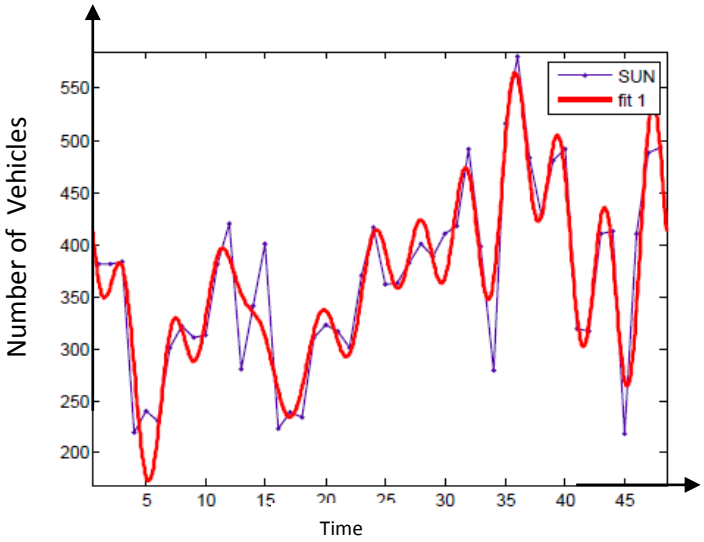

Figure 7 . The graph of all Sundays in the month

DATA COLLECTED WITH TIME FOR THE MODEL

	Day	ACTUAL VALUES	PREDICTED VALUES	RESIDUALS
MONDAYS	1	438	433.823487	-4.17651
	2	443	450.9658631	7.965863
	3	487	488.2024573	1.202457
	4	518	511.5224171	-6.47758
	5	482	511.9400168	29.94002
	6	477	502.8702206	25.87022
	7	507	504.9228007	-2.0772
	8	501	523.4248289	22.42483
	9	568	541.128361	-26.8716
	10	516	534.049645	18.04964
	11	515	495.8273218	-19.1727
	12	501	447.1437373	-53.8563
	13	401	420.3715497	19.37155

14	442	432.8745357	-9.12546
15	481	473.1645705	-7.83543
16	508	512.1609009	4.160901
17	489	528.5546751	39.55468
18	487	524.799534	37.79953
19	509	520.0329206	11.03292
20	569	528.4271642	-40.5728
21	517	544.6629861	27.66299
22	525	550.1742278	25.17423
23	562	532.9989049	-29.0011
24	581	501.0092177	-79.9908
25	445	475.425984	30.42598
26	461	471.3187087	10.31871
27	491	484.5103608	-6.48964
28	523	497.5558363	-25.4442
29	491	498.2622496	7.26225
30	492	491.8121075	-0.18789
31	403	494.2455111	91.24551
32	555	514.0626252	-40.9374
33	507	540.9449429	33.94494
34	557	553.702578	-3.29742
35	556	540.251811	-15.7482
36	515	509.9456279	-5.05437
37	511	485.6001565	-25.3998
38	526	482.4676922	-43.5323
39	492	494.5878816	2.587882
40	524	502.0898002	-21.9102
41	445	492.4587535	47.45875
42	482	474.6161008	-7.3839
43	423	471.1279594	48.12796
44	493	495.1559439	2.155944
45	511	534.3254148	23.32541
46	553	558.0577781	5.057778
47	561	542.9603454	-18.0397

	48	525	493.4149184	-31.5851
	49	419	438.4014409	19.40144
	50	432	407.4000128	-24.6
	51	451	407.361753	-43.6382
	52	403	421.1764668	18.17647
	53	411	427.513529	16.51353
	54	422	422.0981036	0.098104
	55	419	420.12655	1.12655
	56	400	438.4625248	38.46252
	57	473	475.8982355	2.898235
	58	342.00	511.2381401	169.2381
	59	412.00	521.2567235	109.2567
	60	436.00	501.2036999	65.2037
	61		468.2573651	
	62		445.0184758	
	63		439.2386531	
	64		438.9359061	
	65		426.4078476	
TUESDAYS	1	402	388.9570897	-13.0429
	2	421	443.2309023	22.2309
	3	447	465.8798725	18.87987
	4	449	465.2307181	16.23072
	5	511	464.4755054	-46.5245
	6	442	484.7088029	42.7088
	7	492	528.0099609	36.00996
	8	562	574.6225812	12.62258
	9	571	597.1886473	26.18865
	10	592	581.1615437	-10.8385
	11	571	535.4592074	-35.5408
	12	495	485.3602772	-9.63972
	13	403	453.9797968	50.9798
	14	419	447.4864588	28.48646
	15	451	455.3500783	4.350078
	16	453	463.8520914	10.85209

17	517	470.0235008	-46.9765
18	432	483.4240831	51.42408
19	496	514.3483257	18.34833
20	569	559.4099647	-9.59004
21	601	598.2794169	-2.72058
22	599	606.052479	7.052479
23	581	572.1399216	-8.86008
24	489	510.2974638	21.29746
25	401	450.995462	49.99546
26	418	421.4564615	3.456462
27	451	428.6400683	-22.3599
28	499	457.9363526	-41.0636
29	501	487.4681364	-13.5319
30	451	505.4500155	54.45002
31	481	516.3248289	35.32483
32	501	531.6132081	30.61321
33	591	554.7268666	-36.2731
34	601	574.050499	-26.9495
35	590	571.149451	-18.8505
36	581	537.4620224	-43.538
37	389	484.9192837	95.91928
38	422	440.5042318	18.50423
39	426	428.087609	2.087609
40	510	451.7232499	-58.2768
41	501	493.7172976	-7.2827
42	513	528.8148596	15.81486
43	501	542.7572927	41.75729
44	611	540.2002818	-70.7997
45	509	536.2243846	27.22438
46	593	539.5708134	-53.4292
47	517	542.5638839	25.56388
48	519	526.7287313	7.728731
49	411	479.4970681	68.49707
50	421	407.703151	-13.2968
51	421	336.0421204	-84.9579
52	419	291.2076512	-127.792

	53	101	284.4197304	183.4197
	54	319	306.344754	-12.6552
	55	348	337.9263651	-10.0736
	56	440	367.2967505	-72.7032
	57	410	398.0557471	-11.9443
	58	383	441.923335	58.92333
	59	533	502.5075259	-30.4925
	60	581	564.954725	-16.0453
	61		601.6351122	
	62		590.5367238	
	63		532.0260453	
	64		450.4079565	
WEDNESDAYS	1	374	373.4081841	-0.59182
	2	386	399.0818928	13.08189
	3	456	430.178564	-25.8214
	4	461	452.6255471	-8.37445
	5	471	460.6151086	-10.3849
	6	454	466.9657152	12.96572
	7	481	490.1539047	9.153905
	8	516	531.6131789	15.61318
	9	559	568.2484352	9.248435
	10	618	570.4473372	-47.5527
	11	515	529.6419887	14.64199
	12	484	468.4298527	-15.5701
	13	401	422.3321001	21.3321
	14	392	410.0271562	18.02716
	15	398	420.5812411	22.58124
	16	450	429.5754523	-20.4245
	17	411	427.1901334	16.19013
	18	423	429.1015923	6.101592
	19	497	458.2528599	-38.7471
	20	518	515.5517109	-2.44829
	21	562	570.2494794	8.249479
	22	582	582.5620232	0.562023
	23	518	539.0812398	21.08124

24	512	467.2809758	-44.719
25	384	413.9210659	29.92107
26	390	406.3315114	16.33151
27	461	432.3177709	-28.6822
28	472	456.9369503	-15.063
29	409	459.0581671	50.05817
30	461	451.6383226	-9.36168
31	483	465.7650491	-17.235
32	526	514.3923592	-11.6076
33	561	572.3889652	11.38897
34	592	594.4440551	2.444055
35	562	555.6386536	-6.36135
36	464	476.5941976	12.5942
37	401	408.6040326	7.604033
38	399	391.5543644	-7.44564
39	452	423.0237181	-28.9763
40	473	466.1715689	-6.82843
41	471	487.2596638	16.25966
42	472	486.1794797	14.17948
43	492	491.321624	-0.67838
44	533	525.3820122	-7.61799
45	553	576.94206	23.94206
46	601	606.7075947	5.707595
47	603	583.2552672	-19.7447
48	573	514.1825996	-58.8174
49	391	442.6106283	51.61063
50	401	411.8540993	10.8541
51	444	430.9121245	-13.0879
52	475	471.8241384	-3.17586
53	473	499.1526124	26.15261
54	511	502.0335107	-8.96649
55	509	498.7484223	-10.2516
56	517	511.9575408	-5.04246
57	551	541.3414004	-9.6586
58	552	561.7058827	9.705883

	59	501	548.2826771	47.28268
	60	538	503.6180606	-34.3819
	61		458.944237	
	62		448.1236349	
	63		478.8422033	
	64		527.7084587	
THURSDAYS	1	380	378.5965277	-1.40347
	2	412	411.8496712	-0.15033
	3	432	431.2397549	-0.76025
	4	413	409.0522904	-3.94771
	5	472	467.4381814	-4.56182
	6	454	452.5432244	-1.45678
	7	464	461.7505732	-2.24943
	8	428	439.2138049	11.2138
	9	430	468.6809097	38.68091
	10	598	547.6839807	-50.316
	11	518	513.1698456	-4.83015
	12	491	491.36852	0.36852
	13	411	422.8010244	11.80102
	14	418	436.0212071	18.02121
	15	441	447.1725557	6.172556
	16	419	421.4362338	2.436234
	17	492	463.7016657	-28.2983
	18	455	452.5691538	-2.43085
	19	473	484.2393581	11.23936
	20	438	455.5937328	17.59373
	21	518	472.5342377	-45.4658
	22	492	536.7025451	44.70255
	23	512	510.3159406	-1.68406
	24	501	483.9888474	-17.0112
	25	375	392.4996856	17.49969
	26	422	407.471035	-14.529
	27	439	430.6636887	-8.33631
	28	419	424.2030762	5.203076
	29	451	458.5400595	7.54006

	30	453	448.8847502	-4.11525
	31	490	503.8835226	13.88352
	32	501	482.7090914	-18.2909
	33	495	495.6949403	0.69494
	34	539	542.2739104	3.27391
	35	525	527.1151278	2.115128
	36	503	507.153749	4.153749
	37	403	400.1691985	-2.8308
	38	421	406.7099723	-14.29
	39	441	430.2453316	-10.7547
	40	423	440.3512312	17.35123
	41	432	459.3777613	27.37776
	42	461	433.5553181	-27.4447
	43	482	493.1737251	11.17373
	44	498	479.0252619	-18.9747
	45	498	494.028498	-3.9715
	46	513	522.8857282	9.885728
	47	509	522.7393649	13.73936
	48	538	525.712748	-12.2873
	49		426.4257479	
	50		430.204613	
	51		447.1692333	
	52		464.9815494	
	53		448.6433039	
FRIDAYS	1	380	379.2200146	-0.77999
	2	412	394.7310938	-17.2689
	3	432	444.6978842	12.69788
	4	413	421.6941956	8.694196
	5	472	436.1583611	-35.8416
	6	454	489.5350808	35.53508
	7	464	445.3715623	-18.6284
	8	428	445.3682423	17.36824
	9	530	539.2465984	9.246598
	10	598	551.6812318	-46.3188
	11	518	522.7319427	4.731943

12	492	499.810588	7.810588
13	402	436.1326024	34.1326
14	422	430.1193109	8.119311
15	441	452.4315116	11.43151
16	423	416.429791	-6.57021
17	489	447.0670393	-41.933
18	471	495.454988	24.45499
19	469	443.99723	-25.0028
20	448	459.6750047	11.675
21	533	548.9956848	15.99568
22	541	552.2871485	11.28715
23	528	530.4191039	2.419104
24	502	493.2889779	-8.71102
25	396	410.98741	14.98741
26	421	395.2575225	-25.7425
27	428	388.8650122	-39.135
28	300	339.5547428	39.55474
29	394	379.1482223	-14.8518
30	416	414.0965238	-1.90348
31	309	359.5247463	50.52475
32	411	397.4265151	-13.5735
33	501	493.660618	-7.33938
34	543	514.8677538	-28.1322
35	513	530.5329693	17.53297
36	541	512.6889083	-28.3111
37	431	452.7784355	21.77844
38	459	460.4443094	1.444309
39	463	451.4757137	-11.5243
40	401	412.5155831	11.51558
41	434	467.5297212	33.52972
42	493	483.1254843	-9.87452
43	418	414.9613303	-3.03867
44	493	447.7187167	-45.2813
45	493	514.2139202	21.21392
46	513	518.3085752	5.308575

	47	497	530.0312455	33.03125
	48	517	492.6351615	-24.3648
	49		426.3496624	
	50		428.5610697	
	51		396.6170808	
	52		359.5982019	
	53		419.6313652	
	54		410.3494134	
SATURDAYS	1	281	267.901649	-13.0984
	2	262	269.8317348	7.831735
	3	300	308.8257744	8.825774
	4	331	323.0867475	-7.91325
	5	281	300.3894142	19.38941
	6	303	291.2676013	-11.7324
	7	321	306.3257194	-14.6743
	8	301	313.471727	12.47173
	9	341	323.2783651	-17.7216
	10	361	364.4243856	3.424386
	11	381	393.9128783	12.91288
	12	390	348.8530165	-41.147
	13	201	268.7163915	67.71639
	14	283	248.962457	-34.0375
	15	292	291.8780077	-0.12199
	16	321	318.7126256	-2.28737
	17	289	308.2885838	19.28858
	18	312	307.1143831	-4.88562
	19	330	323.647703	-6.3523
	20	321	328.1988414	7.198841
	21	352	335.8933293	-16.1067
	22	372	377.1362541	5.136254
	23	392	411.191838	19.19184
	24	401	380.8672977	-20.1327
	25	301	323.7743278	22.77433
	26	338	316.6784833	-21.3215
	27	351	341.8139557	-9.18604

	28	300	324.2861258	24.28613
	29	289	270.7596602	-18.2403
	30	228	254.4297692	26.42977
	31	321	290.3995906	-30.6004
	32	309	336.2956307	27.29563
	33	396	383.7448056	-12.2552
	34	428	440.3489413	12.34894
	35	478	459.171442	-18.8286
	36	441	399.0659899	-41.934
	37	263	318.8978767	55.89788
	38	318	302.1244852	-15.8755
	39	329	326.7007612	-2.29924
	40	301	317.820026	16.82003
	41	300	285.1659963	-14.834
	42	311	294.4274625	-16.5725
	43	301	343.9613795	42.96138
	44	395	381.7949476	-13.2051
	45	417	405.8694783	-11.1305
	46	458	441.504405	-16.4956
	47	421	463.6256931	42.62569
	48	469	446.3306715	-22.6693
	49		441.1390795	
	50		499.6560318	
	51		568.9056069	
	52		571.021778	
	53		536.2811271	
	54		549.5965925	
SUNDAYS	1	381	367.5422222	-13.4578
	2	381	358.3603166	-22.6397
	3	384	378.2239711	-5.77603
	4	220	282.6211743	62.62117
	5	240	176.8485368	-63.1515
	6	231	218.5580803	-12.4419
	7	301	314.7909612	13.79096
	8	322	317.3964364	-4.60356

9	311	287.2155687	-23.7844
10	314	329.2339193	15.23392
11	382	388.727753	6.727753
12	421	384.4632469	-36.5368
13	281	350.2036698	69.20367
14	341	332.6674165	-8.33258
15	401	307.7887459	-93.2113
16	223	260.6186457	37.61865
17	239	232.8165979	-6.1834
18	235	258.7081765	23.70818
19	311	313.0961636	2.096164
20	323	335.5248638	12.52486
21	317	306.9684525	-10.0315
22	301	292.6340872	-8.36591
23	371	348.3628668	-22.6371
24	417	409.2053351	-7.79466
25	362	391.6371992	29.6372
26	363	354.9185491	-8.08145
27	383	387.1577131	4.157713
28	401	421.8132871	20.81329
29	389	382.2212961	-6.7787
30	411	365.3501458	-45.6499
31	418	439.244586	21.24459
32	492	464.769429	-27.2306
33	398	375.9659533	-22.034
34	279	359.0219463	80.02195
35	517	492.7515632	-24.2484
36	581	561.0683735	-19.9316
37	483	468.2763196	-14.7237
38	429	422.0286645	-6.97134
39	481	490.9546997	9.9547
40	492	466.1096251	-25.8904
41	319	329.6017438	10.60174
42	317	319.571304	2.571304
43	411	422.643642	11.64364

44	413	386.6376483	-26.3624
45	219	267.0639779	48.06398
46	411	338.3356127	-72.6644
47	489	511.8098146	22.80981
48	493	485.3472746	-7.65273
49		340.1897837	
50		348.086858	
51		405.0621933	
52		283.2534885	
53		141.358065	

1.4 FINDINGS

The findings from the model are as follows

1. The Polynomial Sine function of order 8 was found to be the best fit among others.
2. The applied model also gives the best goodness of fit as shown in Table 6

1.5 CONCLUSION

This study has successfully determine the optimal model for predicting road traffic congestion at Lekki/Epe Tollgate, Lagos, which will enhance the effective management and control of traffic grid lock in the area. The data used were collected from the area for 31 days using primary data collection method. Work in other congested area on Nigeria high ways are ongoing which we hope to publish.

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