

Report

User :urbansystem

Name :Mansour Mobeni

Email ID :mansour_nl_ir@yahoo.com

University/College Name :

Report

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University/College Name :



Experiment No. 7

January 13, 2016, 5:22 pm

Calibration Of Singly Constrained Gravity Model (Origin)

Input Values :

Base Year Origin-Destination Cost Matrix		
Origin	Destination	Cost
1	1	0
1	2	10
1	3	25
1	4	14
1	5	8
1	6	19
1	7	25
1	8	23
1	9	27
1	10	24



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1	11	36
1	12	66
1	13	31
1	14	42

Origin	Destination	Cost
2	1	10
2	2	0
2	3	22
2	4	17
2	5	15
2	6	23
2	7	27
2	8	14
2	9	23



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2	10	22
2	11	40
2	12	63
2	13	26
2	14	38

Origin	Destination	Cost
3	1	24
3	2	22
3	3	0
3	4	13
3	5	25
3	6	38
3	7	38
3	8	28



3	9	17
3	10	11
3	11	49
3	12	57
3	13	27
3	14	37

Origin	Destination	Cost
4	1	14
4	2	17
4	3	13
4	4	0
4	5	18
4	6	26
4	7	28



4	8	26
4	9	30
4	10	25
4	11	40
4	12	67
4	13	32
4	14	45

Origin	Destination	Cost
5	1	8
5	2	15
5	3	26
5	4	20
5	5	0
5	6	20



5	7	21
5	8	28
5	9	32
5	10	29
5	11	29
5	12	65
5	13	36
5	14	47

Origin	Destination	Cost
6	1	22
6	2	23
6	3	32
6	4	22
6	5	21



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6	6	0
6	7	23
6	8	32
6	9	35
6	10	32
6	11	44
6	12	77
6	13	42
6	14	52

Origin	Destination	Cost
7	1	28
7	2	30
7	3	36
7	4	32



7	5	21
7	6	27
7	7	0
7	8	39
7	9	43
7	10	40
7	11	29
7	12	65
7	13	47
7	14	58

Origin	Destination	Cost
8	1	24
8	2	14
8	3	28



8	4	28
8	5	26
8	6	35
8	7	40
8	8	0
8	9	27
8	10	22
8	11	46
8	12	50
8	13	33
8	14	45

Origin	Destination	Cost
9	1	29
9	2	30



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9	3	17
9	4	23
9	5	30
9	6	43
9	7	43
9	8	35
9	9	0
9	10	15
9	11	63
9	12	57
9	13	23
9	14	32

Origin	Destination	Cost
10	1	23



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10	2	19
10	3	11
10	4	25
10	5	25
10	6	34
10	7	39
10	8	22
10	9	15
10	10	0
10	11	53
10	12	60
10	13	25
10	14	35

Origin	Destination	Cost
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11	1	46
11	2	48
11	3	55
11	4	48
11	5	32
11	6	43
11	7	32
11	8	57
11	9	64
11	10	60
11	11	0
11	12	52
11	13	68
11	14	76



Origin	Destination	Cost
12	1	58
12	2	54
12	3	61
12	4	62
12	5	60
12	6	69
12	7	57
12	8	41
12	9	61
12	10	55
12	11	37
12	12	0
12	13	58
12	14	62



Origin	Destination	Cost
13	1	34
13	2	29
13	3	38
13	4	36
13	5	37
13	6	45
13	7	51
13	8	36
13	9	27
13	10	32
13	11	62
13	12	52
13	13	0
13	14	18



Origin	Destination	Cost
14	1	44
14	2	39
14	3	30
14	4	35
14	5	42
14	6	54
14	7	55
14	8	45
14	9	33
14	10	33
14	11	75
14	12	61
14	13	18
14	14	0



Given Base Year Trip Matrix		
Origin	Destination	No. of Trips
1	1	428.6155
1	2	157.97045
1	3	157.97045
1	4	157.97045
1	5	315.9409
1	6	157.97045
1	7	220.6443
1	8	147.6446
1	9	157.97045
1	10	157.97045
1	11	157.97045
1	12	157.97045
1	13	157.97045



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1	14	157.97045
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Origin	Destination	No. of Trips
2	1	153.9845
2	2	1008.029
2	3	801.4462
2	4	93.64287
2	5	76.99225
2	6	76.99225
2	7	76.99225
2	8	433.5992
2	9	75.28658
2	10	1596.431
2	11	76.99225
2	12	76.99225



2	13	76.99225
2	14	69.80764

Origin	Destination	No. of Trips
3	1	383.5854
3	2	154.99155
3	3	154.9916
3	4	309.9831
3	5	154.99155
3	6	154.99155
3	7	154.99155
3	8	83.12612
3	9	154.99155
3	10	154.99155
3	11	154.99155



3	12	154.99155
3	13	154.99155
3	14	284.3276

Origin	Destination	No. of Trips
4	1	105.4877
4	2	105.4877
4	3	105.4877
4	4	71.19773
4	5	210.9754
4	6	363.2069
4	7	105.4877
4	8	127.8796
4	9	105.4877
4	10	2009.018



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4	11	105.4877
4	12	105.4877
4	13	105.4877
4	14	42.00857

Origin	Destination	No. of Trips
5	1	185.2548
5	2	185.2548
5	3	185.2548
5	4	185.2548
5	5	257.4337
5	6	185.2548
5	7	370.5096
5	8	184.532
5	9	185.2548



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5	10	185.2548
5	11	185.2548
5	12	185.2548
5	13	185.2548
5	14	185.2548

Origin	Destination	No. of Trips
6	1	143.17185
6	2	285.0876
6	3	143.17185
6	4	64.61918
6	5	286.3437
6	6	77.14922
6	7	143.17185
6	8	36.4499



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6	9	143.17185
6	10	143.17185
6	11	143.17185
6	12	34.0992
6	13	143.17185
6	14	113.2928

Origin	Destination	No. of Trips
7	1	115.23315
7	2	322.3624
7	3	115.23315
7	4	93.00691
7	5	230.4663
7	6	610.409
7	7	746.3546



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7	8	217.1002
7	9	91.68806
7	10	115.23315
7	11	115.23315
7	12	115.23315
7	13	115.23315
7	14	111.8095

Origin	Destination	No. of Trips
8	1	42.93877
8	2	778.9419
8	3	563.5814
8	4	77.34175
8	5	296.5437
8	6	362.968



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8	7	422.5428
8	8	1332.012
8	9	330.249
8	10	1063.762
8	11	389.47095
8	12	48.1849
8	13	410.103
8	14	826.1066

Origin	Destination	No. of Trips
9	1	195.6988
9	2	195.6988
9	3	391.3976
9	4	55.51776
9	5	195.6988



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9	6	195.6988
9	7	178.0494
9	8	271.107
9	9	670.8946
9	10	195.6988
9	11	195.6988
9	12	195.6988
9	13	195.6988
9	14	513.064

Origin	Destination	No. of Trips
10	1	367.0389
10	2	367.0389
10	3	367.0389
10	4	367.0389



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10	5	367.0389
10	6	367.0389
10	7	367.0389
10	8	734.0778
10	9	367.0389
10	10	367.0389
10	11	367.0389
10	12	367.0389
10	13	367.0389
10	14	367.0389

Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0



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11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0

Origin	Destination	No. of Trips
12	1	0
12	2	0



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12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0

Origin	Destination	No. of Trips
13	1	155.0559



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13	2	482.0706
13	3	155.0559
13	4	155.0559
13	5	155.0559
13	6	257.2405
13	7	285.6512
13	8	81.57111
13	9	459.0396
13	10	155.0559
13	11	155.0559
13	12	155.0559
13	13	155.0559
13	14	310.1118

Origin	Destination	No. of Trips
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14	1	127.4274
14	2	127.4274
14	3	96.00859
14	4	30.44989
14	5	127.4274
14	6	108.3454
14	7	127.4274
14	8	237.2254
14	9	318.9888
14	10	127.4274
14	11	127.4274
14	12	28.63854
14	13	254.8548
14	14	155.6117



Sum Totals of Origin		Sum Totals of Destination	
Origin	Totals	Destination	Totals
O1	2692.5498	D1	2403.49267
O2	4694.18049	D2	4170.3611
O3	2610.93777	D3	3236.63814
O4	3668.1878	D4	1661.07924
O5	2850.2781	D5	2674.9085
O6	1899.24455	D6	2917.26577
O7	3114.59587	D7	3198.86155
O8	6944.74677	D8	3886.32493
O9	3645.62076	D9	3060.06189
O10	5505.5835	D10	6271.0538
O11	0	D11	2173.7937
O12	0	D12	1624.64614
O13	3116.13201	D13	2321.85315



O14	1994.68752	D14	3136.40436
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Selected Frictional Functions : Power Function [$F_{ij} = C_{ij}^B$]

Solution :

Trip Matrix with respect to Optimal Beta Value (Minimum SSE)		
Origin	Destination	No. of Trips
1	1	0
1	2	278
1	3	216
1	4	110
1	5	178
1	6	194
1	7	213



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1	8	259
1	9	204
1	10	418
1	11	145
1	12	108
1	13	155
1	14	209

Origin	Destination	No. of Trips
2	1	292
2	2	0
2	3	393
2	4	202
2	5	325
2	6	355



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2	7	389
2	8	472
2	9	372
2	10	763
2	11	264
2	12	197
2	13	282
2	14	381

Origin	Destination	No. of Trips
3	1	158
3	2	275
3	3	0
3	4	109
3	5	176



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3	6	192
3	7	211
3	8	256
3	9	202
3	10	414
3	11	143
3	12	107
3	13	153
3	14	207

Origin	Destination	No. of Trips
4	1	214
4	2	372
4	3	288
4	4	0



4	5	238
4	6	260
4	7	285
4	8	347
4	9	273
4	10	560
4	11	194
4	12	145
4	13	207
4	14	280

Origin	Destination	No. of Trips
5	1	170
5	2	296
5	3	230



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5	4	118
5	5	0
5	6	207
5	7	227
5	8	276
5	9	217
5	10	446
5	11	154
5	12	115
5	13	165
5	14	223

Origin	Destination	No. of Trips
6	1	114
6	2	198



6	3	154
6	4	79
6	5	127
6	6	0
6	7	152
6	8	185
6	9	145
6	10	299
6	11	103
6	12	77
6	13	110
6	14	149

Origin	Destination	No. of Trips
7	1	189



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7	2	328
7	3	254
7	4	130
7	5	210
7	6	229
7	7	0
7	8	306
7	9	241
7	10	494
7	11	171
7	12	128
7	13	182
7	14	247

Origin	Destination	No. of Trips
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8	1	429
8	2	744
8	3	578
8	4	296
8	5	478
8	6	521
8	7	572
8	8	0
8	9	546
8	10	1120
8	11	388
8	12	290
8	13	415
8	14	560



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Origin	Destination	No. of Trips
9	1	220
9	2	383
9	3	297
9	4	152
9	5	245
9	6	268
9	7	294
9	8	357
9	9	0
9	10	575
9	11	199
9	12	149
9	13	213
9	14	288



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Origin	Destination	No. of Trips
10	1	362
10	2	629
10	3	488
10	4	250
10	5	403
10	6	440
10	7	483
10	8	586
10	9	461
10	10	0
10	11	328
10	12	245
10	13	350
10	14	473



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Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0
11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0



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Origin	Destination	No. of Trips
12	1	0
12	2	0
12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0



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Origin	Destination	No. of Trips
13	1	185
13	2	321
13	3	249
13	4	128
13	5	206
13	6	224
13	7	246
13	8	299
13	9	235
13	10	483
13	11	167
13	12	125
13	13	0
13	14	241



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Origin	Destination	No. of Trips
14	1	121
14	2	210
14	3	162
14	4	83
14	5	134
14	6	146
14	7	161
14	8	195
14	9	154
14	10	315
14	11	109
14	12	81
14	13	116
14	14	0



Minimum Residual = 10282250.068479

Optimal Beta = 0.001

Target Oi	Modelled Oi	Target Dj	Modelled Dj
2692.5498	2692.5498	2403.49267	2460.0176753688
4694.18049	4694.18049	4170.3611	4039.1077692164
2610.93777	2610.93777	3236.63814	3315.1327320186
3668.1878	3668.1878	1661.07924	1662.9141491183
2850.2781	2850.2781	2674.9085	2726.3350472407
1899.24455	1899.24455	2917.26577	3042.7935060452
3114.59587	3114.59587	3198.86155	3237.4457270395
6944.74677	6944.74677	3886.32493	3543.5787054569
3645.62076	3645.62076	3060.06189	3055.8678582184
5505.5835	5505.5835	6271.0538	5891.3593019328
0	0	2173.7937	2371.8940467913
0	0	1624.64614	1773.1896787308



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3116.13201	3116.13201	2321.85315	2353.3740445924
1994.68752	1994.68752	3136.40436	3263.7346982298

Beta	Residual SSE
0.001	10282250.068479
0.002	10282250.068479
0.003	10282250.068479
0.004	10282250.068479
0.005	10282250.068479
0.006	10282250.068479
0.007	10282250.068479
0.008	10282250.068479
0.009	10282250.068479
0.01	10282250.068479



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0.011	10282250.068479
0.012	10282250.068479
0.013	10282250.068479
0.014	10282250.068479
0.015	10282250.068479
0.016	10282250.068479
0.017	10282250.068479
0.018	10282250.068479
0.019	10282250.068479
0.02	10282250.068479
0.021	10282250.068479
0.022	10282250.068479
0.023	10282250.068479
0.024	10282250.068479
0.025	10282250.068479



0.026	10282250.068479
0.027	10282250.068479
0.028	10282250.068479
0.029	10282250.068479
0.03	10282250.068479
0.031	10282250.068479
0.032	10282250.068479
0.033	10282250.068479
0.034	10282250.068479
0.035	10282250.068479
0.036	10282250.068479
0.037	10282250.068479
0.038	10282250.068479
0.039	10282250.068479
0.04	10282250.068479



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0.041	10282250.068479
0.042	10282250.068479
0.043	10282250.068479
0.044	10282250.068479
0.045	10282250.068479
0.046	10282250.068479
0.047	10282250.068479
0.048	10282250.068479
0.049	10282250.068479
0.05	10282250.068479
0.051	10282250.068479
0.052	10282250.068479
0.053	10282250.068479
0.054	10282250.068479
0.055	10282250.068479



0.056	10282250.068479
0.057	10282250.068479
0.058	10282250.068479
0.059	10282250.068479
0.06	10282250.068479
0.061	10282250.068479
0.062	10282250.068479
0.063	10282250.068479
0.064	10282250.068479
0.065	10282250.068479
0.066	10282250.068479
0.067	10282250.068479
0.068	10282250.068479
0.069	10282250.068479
0.07	10282250.068479



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0.071	10282250.068479
0.072	10282250.068479
0.073	10282250.068479
0.074	10282250.068479
0.075	10282250.068479
0.076	10282250.068479
0.077	10282250.068479
0.078	10282250.068479
0.079	10282250.068479
0.08	10282250.068479
0.081	10282250.068479
0.082	10282250.068479
0.083	10282250.068479
0.084	10282250.068479
0.085	10282250.068479



0.086	10282250.068479
0.087	10282250.068479
0.088	10282250.068479
0.089	10282250.068479
0.09	10282250.068479
0.091	10282250.068479
0.092	10282250.068479
0.093	10282250.068479
0.094	10282250.068479
0.095	10282250.068479
0.096	10282250.068479
0.097	10282250.068479
0.098	10282250.068479
0.099	10282250.068479
0.1	10282250.068479



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0.101	10282250.068479
0.102	10282250.068479
0.103	10282250.068479
0.104	10282250.068479
0.105	10282250.068479
0.106	10282250.068479
0.107	10282250.068479
0.108	10282250.068479
0.109	10282250.068479
0.11	10282250.068479
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0.757	10282250.068479
0.758	10282250.068479
0.759	10282250.068479
0.76	10282250.068479



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0.761	10282250.068479
0.762	10282250.068479
0.763	10282250.068479
0.764	10282250.068479
0.765	10282250.068479
0.766	10282250.068479
0.767	10282250.068479
0.768	10282250.068479
0.769	10282250.068479
0.77	10282250.068479
0.771	10282250.068479
0.772	10282250.068479
0.773	10282250.068479
0.774	10282250.068479
0.775	10282250.068479



0.776	10282250.068479
0.777	10282250.068479
0.778	10282250.068479
0.779	10282250.068479
0.78	10282250.068479
0.781	10282250.068479
0.782	10282250.068479
0.783	10282250.068479
0.784	10282250.068479
0.785	10282250.068479
0.786	10282250.068479
0.787	10282250.068479
0.788	10282250.068479
0.789	10282250.068479
0.79	10282250.068479



0.791	10282250.068479
0.792	10282250.068479
0.793	10282250.068479
0.794	10282250.068479
0.795	10282250.068479
0.796	10282250.068479
0.797	10282250.068479
0.798	10282250.068479
0.799	10282250.068479
0.8	10282250.068479
0.801	10282250.068479
0.802	10282250.068479
0.803	10282250.068479
0.804	10282250.068479
0.805	10282250.068479



0.806	10282250.068479
0.807	10282250.068479
0.808	10282250.068479
0.809	10282250.068479
0.81	10282250.068479
0.811	10282250.068479
0.812	10282250.068479
0.813	10282250.068479
0.814	10282250.068479
0.815	10282250.068479
0.816	10282250.068479
0.817	10282250.068479
0.818	10282250.068479
0.819	10282250.068479
0.82	10282250.068479



0.821	10282250.068479
0.822	10282250.068479
0.823	10282250.068479
0.824	10282250.068479
0.825	10282250.068479
0.826	10282250.068479
0.827	10282250.068479
0.828	10282250.068479
0.829	10282250.068479
0.83	10282250.068479
0.831	10282250.068479
0.832	10282250.068479
0.833	10282250.068479
0.834	10282250.068479
0.835	10282250.068479



0.836	10282250.068479
0.837	10282250.068479
0.838	10282250.068479
0.839	10282250.068479
0.84	10282250.068479
0.841	10282250.068479
0.842	10282250.068479
0.843	10282250.068479
0.844	10282250.068479
0.845	10282250.068479
0.846	10282250.068479
0.847	10282250.068479
0.848	10282250.068479
0.849	10282250.068479
0.85	10282250.068479



0.851	10282250.068479
0.852	10282250.068479
0.853	10282250.068479
0.854	10282250.068479
0.855	10282250.068479
0.856	10282250.068479
0.857	10282250.068479
0.858	10282250.068479
0.859	10282250.068479
0.86	10282250.068479
0.861	10282250.068479
0.862	10282250.068479
0.863	10282250.068479
0.864	10282250.068479
0.865	10282250.068479



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0.866	10282250.068479
0.867	10282250.068479
0.868	10282250.068479
0.869	10282250.068479
0.87	10282250.068479
0.871	10282250.068479
0.872	10282250.068479
0.873	10282250.068479
0.874	10282250.068479
0.875	10282250.068479
0.876	10282250.068479
0.877	10282250.068479
0.878	10282250.068479
0.879	10282250.068479
0.88	10282250.068479



0.881	10282250.068479
0.882	10282250.068479
0.883	10282250.068479
0.884	10282250.068479
0.885	10282250.068479
0.886	10282250.068479
0.887	10282250.068479
0.888	10282250.068479
0.889	10282250.068479
0.89	10282250.068479
0.891	10282250.068479
0.892	10282250.068479
0.893	10282250.068479
0.894	10282250.068479
0.895	10282250.068479



0.896	10282250.068479
0.897	10282250.068479
0.898	10282250.068479
0.899	10282250.068479
0.9	10282250.068479
0.901	10282250.068479
0.902	10282250.068479
0.903	10282250.068479
0.904	10282250.068479
0.905	10282250.068479
0.906	10282250.068479
0.907	10282250.068479
0.908	10282250.068479
0.909	10282250.068479
0.91	10282250.068479



0.911	10282250.068479
0.912	10282250.068479
0.913	10282250.068479
0.914	10282250.068479
0.915	10282250.068479
0.916	10282250.068479
0.917	10282250.068479
0.918	10282250.068479
0.919	10282250.068479
0.92	10282250.068479
0.921	10282250.068479
0.922	10282250.068479
0.923	10282250.068479
0.924	10282250.068479
0.925	10282250.068479



0.926	10282250.068479
0.927	10282250.068479
0.928	10282250.068479
0.929	10282250.068479
0.93	10282250.068479
0.931	10282250.068479
0.932	10282250.068479
0.933	10282250.068479
0.934	10282250.068479
0.935	10282250.068479
0.936	10282250.068479
0.937	10282250.068479
0.938	10282250.068479
0.939	10282250.068479
0.94	10282250.068479



0.941	10282250.068479
0.942	10282250.068479
0.943	10282250.068479
0.944	10282250.068479
0.945	10282250.068479
0.946	10282250.068479
0.947	10282250.068479
0.948	10282250.068479
0.949	10282250.068479
0.95	10282250.068479
0.951	10282250.068479
0.952	10282250.068479
0.953	10282250.068479
0.954	10282250.068479
0.955	10282250.068479



0.956	10282250.068479
0.957	10282250.068479
0.958	10282250.068479
0.959	10282250.068479
0.96	10282250.068479
0.961	10282250.068479
0.962	10282250.068479
0.963	10282250.068479
0.964	10282250.068479
0.965	10282250.068479
0.966	10282250.068479
0.967	10282250.068479
0.968	10282250.068479
0.969	10282250.068479
0.97	10282250.068479



0.971	10282250.068479
0.972	10282250.068479
0.973	10282250.068479
0.974	10282250.068479
0.975	10282250.068479
0.976	10282250.068479
0.977	10282250.068479
0.978	10282250.068479
0.979	10282250.068479
0.98	10282250.068479
0.981	10282250.068479
0.982	10282250.068479
0.983	10282250.068479
0.984	10282250.068479
0.985	10282250.068479



0.986	10282250.068479
0.987	10282250.068479
0.988	10282250.068479
0.989	10282250.068479
0.99	10282250.068479
0.991	10282250.068479
0.992	10282250.068479
0.993	10282250.068479
0.994	10282250.068479
0.995	10282250.068479
0.996	10282250.068479
0.997	10282250.068479
0.998	10282250.068479
0.999	10282250.068479



Experiment No. 7

January 13, 2016, 5:25 pm

Calibration Of Singly Constrained Gravity Model (Origin)

Input Values :

Base Year Origin-Destination Cost Matrix		
Origin	Destination	Cost
1	1	0
1	2	10
1	3	25
1	4	14
1	5	8
1	6	19
1	7	25
1	8	23
1	9	27
1	10	24



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1	11	36
1	12	66
1	13	31
1	14	42

Origin	Destination	Cost
2	1	10
2	2	0
2	3	22
2	4	17
2	5	15
2	6	23
2	7	27
2	8	14
2	9	23



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2	10	22
2	11	40
2	12	63
2	13	26
2	14	38

Origin	Destination	Cost
3	1	24
3	2	22
3	3	0
3	4	13
3	5	25
3	6	38
3	7	38
3	8	28



3	9	17
3	10	11
3	11	49
3	12	57
3	13	27
3	14	37

Origin	Destination	Cost
4	1	14
4	2	17
4	3	13
4	4	0
4	5	18
4	6	26
4	7	28



4	8	26
4	9	30
4	10	25
4	11	40
4	12	67
4	13	32
4	14	45

Origin	Destination	Cost
5	1	8
5	2	15
5	3	26
5	4	20
5	5	0
5	6	20



5	7	21
5	8	28
5	9	32
5	10	29
5	11	29
5	12	65
5	13	36
5	14	47

Origin	Destination	Cost
6	1	22
6	2	23
6	3	32
6	4	22
6	5	21



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6	6	0
6	7	23
6	8	32
6	9	35
6	10	32
6	11	44
6	12	77
6	13	42
6	14	52

Origin	Destination	Cost
7	1	28
7	2	30
7	3	36
7	4	32



7	5	21
7	6	27
7	7	0
7	8	39
7	9	43
7	10	40
7	11	29
7	12	65
7	13	47
7	14	58

Origin	Destination	Cost
8	1	24
8	2	14
8	3	28



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8	4	28
8	5	26
8	6	35
8	7	40
8	8	0
8	9	27
8	10	22
8	11	46
8	12	50
8	13	33
8	14	45

Origin	Destination	Cost
9	1	29
9	2	30



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9	3	17
9	4	23
9	5	30
9	6	43
9	7	43
9	8	35
9	9	0
9	10	15
9	11	63
9	12	57
9	13	23
9	14	32

Origin	Destination	Cost
10	1	23



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10	2	19
10	3	11
10	4	25
10	5	25
10	6	34
10	7	39
10	8	22
10	9	15
10	10	0
10	11	53
10	12	60
10	13	25
10	14	35

Origin	Destination	Cost
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11	1	46
11	2	48
11	3	55
11	4	48
11	5	32
11	6	43
11	7	32
11	8	57
11	9	64
11	10	60
11	11	0
11	12	52
11	13	68
11	14	76



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Origin	Destination	Cost
12	1	58
12	2	54
12	3	61
12	4	62
12	5	60
12	6	69
12	7	57
12	8	41
12	9	61
12	10	55
12	11	37
12	12	0
12	13	58
12	14	62



Origin	Destination	Cost
13	1	34
13	2	29
13	3	38
13	4	36
13	5	37
13	6	45
13	7	51
13	8	36
13	9	27
13	10	32
13	11	62
13	12	52
13	13	0
13	14	18



Origin	Destination	Cost
14	1	44
14	2	39
14	3	30
14	4	35
14	5	42
14	6	54
14	7	55
14	8	45
14	9	33
14	10	33
14	11	75
14	12	61
14	13	18
14	14	0



Given Base Year Trip Matrix		
Origin	Destination	No. of Trips
1	1	428.6155
1	2	157.97045
1	3	157.97045
1	4	157.97045
1	5	315.9409
1	6	157.97045
1	7	220.6443
1	8	147.6446
1	9	157.97045
1	10	157.97045
1	11	157.97045
1	12	157.97045
1	13	157.97045



1	14	157.97045
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Origin	Destination	No. of Trips
2	1	153.9845
2	2	1008.029
2	3	801.4462
2	4	93.64287
2	5	76.99225
2	6	76.99225
2	7	76.99225
2	8	433.5992
2	9	75.28658
2	10	1596.431
2	11	76.99225
2	12	76.99225



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2	13	76.99225
2	14	69.80764

Origin	Destination	No. of Trips
3	1	383.5854
3	2	154.99155
3	3	154.9916
3	4	309.9831
3	5	154.99155
3	6	154.99155
3	7	154.99155
3	8	83.12612
3	9	154.99155
3	10	154.99155
3	11	154.99155



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3	12	154.99155
3	13	154.99155
3	14	284.3276

Origin	Destination	No. of Trips
4	1	105.4877
4	2	105.4877
4	3	105.4877
4	4	71.19773
4	5	210.9754
4	6	363.2069
4	7	105.4877
4	8	127.8796
4	9	105.4877
4	10	2009.018



4	11	105.4877
4	12	105.4877
4	13	105.4877
4	14	42.00857

Origin	Destination	No. of Trips
5	1	185.2548
5	2	185.2548
5	3	185.2548
5	4	185.2548
5	5	257.4337
5	6	185.2548
5	7	370.5096
5	8	184.532
5	9	185.2548



5	10	185.2548
5	11	185.2548
5	12	185.2548
5	13	185.2548
5	14	185.2548

Origin	Destination	No. of Trips
6	1	143.17185
6	2	285.0876
6	3	143.17185
6	4	64.61918
6	5	286.3437
6	6	77.14922
6	7	143.17185
6	8	36.4499



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6	9	143.17185
6	10	143.17185
6	11	143.17185
6	12	34.0992
6	13	143.17185
6	14	113.2928

Origin	Destination	No. of Trips
7	1	115.23315
7	2	322.3624
7	3	115.23315
7	4	93.00691
7	5	230.4663
7	6	610.409
7	7	746.3546



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7	8	217.1002
7	9	91.68806
7	10	115.23315
7	11	115.23315
7	12	115.23315
7	13	115.23315
7	14	111.8095

Origin	Destination	No. of Trips
8	1	42.93877
8	2	778.9419
8	3	563.5814
8	4	77.34175
8	5	296.5437
8	6	362.968



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8	7	422.5428
8	8	1332.012
8	9	330.249
8	10	1063.762
8	11	389.47095
8	12	48.1849
8	13	410.103
8	14	826.1066

Origin	Destination	No. of Trips
9	1	195.6988
9	2	195.6988
9	3	391.3976
9	4	55.51776
9	5	195.6988



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9	6	195.6988
9	7	178.0494
9	8	271.107
9	9	670.8946
9	10	195.6988
9	11	195.6988
9	12	195.6988
9	13	195.6988
9	14	513.064

Origin	Destination	No. of Trips
10	1	367.0389
10	2	367.0389
10	3	367.0389
10	4	367.0389



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10	5	367.0389
10	6	367.0389
10	7	367.0389
10	8	734.0778
10	9	367.0389
10	10	367.0389
10	11	367.0389
10	12	367.0389
10	13	367.0389
10	14	367.0389

Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0



11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0

Origin	Destination	No. of Trips
12	1	0
12	2	0



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12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0

Origin	Destination	No. of Trips
13	1	155.0559



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13	2	482.0706
13	3	155.0559
13	4	155.0559
13	5	155.0559
13	6	257.2405
13	7	285.6512
13	8	81.57111
13	9	459.0396
13	10	155.0559
13	11	155.0559
13	12	155.0559
13	13	155.0559
13	14	310.1118

Origin	Destination	No. of Trips
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14	1	127.4274
14	2	127.4274
14	3	96.00859
14	4	30.44989
14	5	127.4274
14	6	108.3454
14	7	127.4274
14	8	237.2254
14	9	318.9888
14	10	127.4274
14	11	127.4274
14	12	28.63854
14	13	254.8548
14	14	155.6117



Sum Totals of Origin		Sum Totals of Destination	
Origin	Totals	Destination	Totals
O1	2692.5498	D1	2403.49267
O2	4694.18049	D2	4170.3611
O3	2610.93777	D3	3236.63814
O4	3668.1878	D4	1661.07924
O5	2850.2781	D5	2674.9085
O6	1899.24455	D6	2917.26577
O7	3114.59587	D7	3198.86155
O8	6944.74677	D8	3886.32493
O9	3645.62076	D9	3060.06189
O10	5505.5835	D10	6271.0538
O11	0	D11	2173.7937
O12	0	D12	1624.64614
O13	3116.13201	D13	2321.85315



O14	1994.68752	D14	3136.40436
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Selected Frictional Functions : Power Function [$F_{ij} = C_{ij}^B$]

Solution :

Trip Matrix with respect to Optimal Beta Value (Minimum SSE)		
Origin	Destination	No. of Trips
1	1	0
1	2	278
1	3	216
1	4	110
1	5	178
1	6	194
1	7	213



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1	8	259
1	9	204
1	10	418
1	11	145
1	12	108
1	13	155
1	14	209

Origin	Destination	No. of Trips
2	1	292
2	2	0
2	3	393
2	4	202
2	5	325
2	6	355



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2	7	389
2	8	472
2	9	372
2	10	763
2	11	264
2	12	197
2	13	282
2	14	381

Origin	Destination	No. of Trips
3	1	158
3	2	275
3	3	0
3	4	109
3	5	176



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3	6	192
3	7	211
3	8	256
3	9	202
3	10	414
3	11	143
3	12	107
3	13	153
3	14	207

Origin	Destination	No. of Trips
4	1	214
4	2	372
4	3	288
4	4	0



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4	5	238
4	6	260
4	7	285
4	8	347
4	9	273
4	10	560
4	11	194
4	12	145
4	13	207
4	14	280

Origin	Destination	No. of Trips
5	1	170
5	2	296
5	3	230



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5	4	118
5	5	0
5	6	207
5	7	227
5	8	276
5	9	217
5	10	446
5	11	154
5	12	115
5	13	165
5	14	223

Origin	Destination	No. of Trips
6	1	114
6	2	198



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6	3	154
6	4	79
6	5	127
6	6	0
6	7	152
6	8	185
6	9	145
6	10	299
6	11	103
6	12	77
6	13	110
6	14	149

Origin	Destination	No. of Trips
7	1	189



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7	2	328
7	3	254
7	4	130
7	5	210
7	6	229
7	7	0
7	8	306
7	9	241
7	10	494
7	11	171
7	12	128
7	13	182
7	14	247

Origin	Destination	No. of Trips
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8	1	429
8	2	744
8	3	578
8	4	296
8	5	478
8	6	521
8	7	572
8	8	0
8	9	546
8	10	1120
8	11	388
8	12	290
8	13	415
8	14	560



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Origin	Destination	No. of Trips
9	1	220
9	2	383
9	3	297
9	4	152
9	5	245
9	6	268
9	7	294
9	8	357
9	9	0
9	10	575
9	11	199
9	12	149
9	13	213
9	14	288



Origin	Destination	No. of Trips
10	1	362
10	2	629
10	3	488
10	4	250
10	5	403
10	6	440
10	7	483
10	8	586
10	9	461
10	10	0
10	11	328
10	12	245
10	13	350
10	14	473



Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0
11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0



Origin	Destination	No. of Trips
12	1	0
12	2	0
12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0



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Origin	Destination	No. of Trips
13	1	185
13	2	321
13	3	249
13	4	128
13	5	206
13	6	224
13	7	246
13	8	299
13	9	235
13	10	483
13	11	167
13	12	125
13	13	0
13	14	241



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Origin	Destination	No. of Trips
14	1	121
14	2	210
14	3	162
14	4	83
14	5	134
14	6	146
14	7	161
14	8	195
14	9	154
14	10	315
14	11	109
14	12	81
14	13	116
14	14	0



Minimum Residual = 10282250.068479

Optimal Beta = 0.001

Target Oi	Modelled Oi	Target Dj	Modelled Dj
2692.5498	2692.5498	2403.49267	2460.0176753688
4694.18049	4694.18049	4170.3611	4039.1077692164
2610.93777	2610.93777	3236.63814	3315.1327320186
3668.1878	3668.1878	1661.07924	1662.9141491183
2850.2781	2850.2781	2674.9085	2726.3350472407
1899.24455	1899.24455	2917.26577	3042.7935060452
3114.59587	3114.59587	3198.86155	3237.4457270395
6944.74677	6944.74677	3886.32493	3543.5787054569
3645.62076	3645.62076	3060.06189	3055.8678582184
5505.5835	5505.5835	6271.0538	5891.3593019328
0	0	2173.7937	2371.8940467913
0	0	1624.64614	1773.1896787308



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3116.13201	3116.13201	2321.85315	2353.3740445924
1994.68752	1994.68752	3136.40436	3263.7346982298

Beta	Residual SSE
0.001	10282250.068479
0.002	10282250.068479
0.003	10282250.068479
0.004	10282250.068479
0.005	10282250.068479
0.006	10282250.068479
0.007	10282250.068479
0.008	10282250.068479
0.009	10282250.068479
0.01	10282250.068479



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0.011	10282250.068479
0.012	10282250.068479
0.013	10282250.068479
0.014	10282250.068479
0.015	10282250.068479
0.016	10282250.068479
0.017	10282250.068479
0.018	10282250.068479
0.019	10282250.068479
0.02	10282250.068479
0.021	10282250.068479
0.022	10282250.068479
0.023	10282250.068479
0.024	10282250.068479
0.025	10282250.068479



0.026	10282250.068479
0.027	10282250.068479
0.028	10282250.068479
0.029	10282250.068479
0.03	10282250.068479
0.031	10282250.068479
0.032	10282250.068479
0.033	10282250.068479
0.034	10282250.068479
0.035	10282250.068479
0.036	10282250.068479
0.037	10282250.068479
0.038	10282250.068479
0.039	10282250.068479
0.04	10282250.068479



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0.041	10282250.068479
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0.043	10282250.068479
0.044	10282250.068479
0.045	10282250.068479
0.046	10282250.068479
0.047	10282250.068479
0.048	10282250.068479
0.049	10282250.068479
0.05	10282250.068479
0.051	10282250.068479
0.052	10282250.068479
0.053	10282250.068479
0.054	10282250.068479
0.055	10282250.068479



0.056	10282250.068479
0.057	10282250.068479
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0.059	10282250.068479
0.06	10282250.068479
0.061	10282250.068479
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0.063	10282250.068479
0.064	10282250.068479
0.065	10282250.068479
0.066	10282250.068479
0.067	10282250.068479
0.068	10282250.068479
0.069	10282250.068479
0.07	10282250.068479



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0.071	10282250.068479
0.072	10282250.068479
0.073	10282250.068479
0.074	10282250.068479
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0.076	10282250.068479
0.077	10282250.068479
0.078	10282250.068479
0.079	10282250.068479
0.08	10282250.068479
0.081	10282250.068479
0.082	10282250.068479
0.083	10282250.068479
0.084	10282250.068479
0.085	10282250.068479



0.086	10282250.068479
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0.095	10282250.068479
0.096	10282250.068479
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0.098	10282250.068479
0.099	10282250.068479
0.1	10282250.068479



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0.114	10282250.068479
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0.146	10282250.068479
0.147	10282250.068479
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0.176	10282250.068479
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0.19	10282250.068479



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0.254	10282250.068479
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0.309	10282250.068479
0.31	10282250.068479



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0.311	10282250.068479
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0.32	10282250.068479
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0.328	10282250.068479
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0.401	10282250.068479
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0.403	10282250.068479
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0.405	10282250.068479
0.406	10282250.068479
0.407	10282250.068479
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0.409	10282250.068479
0.41	10282250.068479
0.411	10282250.068479
0.412	10282250.068479
0.413	10282250.068479
0.414	10282250.068479
0.415	10282250.068479



0.416	10282250.068479
0.417	10282250.068479
0.418	10282250.068479
0.419	10282250.068479
0.42	10282250.068479
0.421	10282250.068479
0.422	10282250.068479
0.423	10282250.068479
0.424	10282250.068479
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0.426	10282250.068479
0.427	10282250.068479
0.428	10282250.068479
0.429	10282250.068479
0.43	10282250.068479



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0.441	10282250.068479
0.442	10282250.068479
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0.444	10282250.068479
0.445	10282250.068479



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0.446	10282250.068479
0.447	10282250.068479
0.448	10282250.068479
0.449	10282250.068479
0.45	10282250.068479
0.451	10282250.068479
0.452	10282250.068479
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0.458	10282250.068479
0.459	10282250.068479
0.46	10282250.068479



0.461	10282250.068479
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0.467	10282250.068479
0.468	10282250.068479
0.469	10282250.068479
0.47	10282250.068479
0.471	10282250.068479
0.472	10282250.068479
0.473	10282250.068479
0.474	10282250.068479
0.475	10282250.068479



0.476	10282250.068479
0.477	10282250.068479
0.478	10282250.068479
0.479	10282250.068479
0.48	10282250.068479
0.481	10282250.068479
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0.499	10282250.068479
0.5	10282250.068479
0.501	10282250.068479
0.502	10282250.068479
0.503	10282250.068479
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0.506	10282250.068479
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0.52	10282250.068479



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0.521	10282250.068479
0.522	10282250.068479
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0.528	10282250.068479
0.529	10282250.068479
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0.531	10282250.068479
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0.536	10282250.068479
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0.699	10282250.068479
0.7	10282250.068479



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0.76	10282250.068479



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0.776	10282250.068479
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0.779	10282250.068479
0.78	10282250.068479
0.781	10282250.068479
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0.799	10282250.068479
0.8	10282250.068479
0.801	10282250.068479
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0.806	10282250.068479
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0.809	10282250.068479
0.81	10282250.068479
0.811	10282250.068479
0.812	10282250.068479
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0.814	10282250.068479
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0.816	10282250.068479
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0.821	10282250.068479
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0.988	10282250.068479
0.989	10282250.068479
0.99	10282250.068479
0.991	10282250.068479
0.992	10282250.068479
0.993	10282250.068479
0.994	10282250.068479
0.995	10282250.068479
0.996	10282250.068479
0.997	10282250.068479
0.998	10282250.068479
0.999	10282250.068479



Experiment No. 7

January 13, 2016, 5:22 pm

Calibration Of Singly Constrained Gravity Model (Origin)

Input Values :

Base Year Origin-Destination Cost Matrix		
Origin	Destination	Cost
1	1	0
1	2	10
1	3	25
1	4	14
1	5	8
1	6	19
1	7	25
1	8	23
1	9	27
1	10	24



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1	11	36
1	12	66
1	13	31
1	14	42

Origin	Destination	Cost
2	1	10
2	2	0
2	3	22
2	4	17
2	5	15
2	6	23
2	7	27
2	8	14
2	9	23



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2	10	22
2	11	40
2	12	63
2	13	26
2	14	38

Origin	Destination	Cost
3	1	24
3	2	22
3	3	0
3	4	13
3	5	25
3	6	38
3	7	38
3	8	28



3	9	17
3	10	11
3	11	49
3	12	57
3	13	27
3	14	37

Origin	Destination	Cost
4	1	14
4	2	17
4	3	13
4	4	0
4	5	18
4	6	26
4	7	28



4	8	26
4	9	30
4	10	25
4	11	40
4	12	67
4	13	32
4	14	45

Origin	Destination	Cost
5	1	8
5	2	15
5	3	26
5	4	20
5	5	0
5	6	20



5	7	21
5	8	28
5	9	32
5	10	29
5	11	29
5	12	65
5	13	36
5	14	47

Origin	Destination	Cost
6	1	22
6	2	23
6	3	32
6	4	22
6	5	21



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6	6	0
6	7	23
6	8	32
6	9	35
6	10	32
6	11	44
6	12	77
6	13	42
6	14	52

Origin	Destination	Cost
7	1	28
7	2	30
7	3	36
7	4	32



7	5	21
7	6	27
7	7	0
7	8	39
7	9	43
7	10	40
7	11	29
7	12	65
7	13	47
7	14	58

Origin	Destination	Cost
8	1	24
8	2	14
8	3	28



8	4	28
8	5	26
8	6	35
8	7	40
8	8	0
8	9	27
8	10	22
8	11	46
8	12	50
8	13	33
8	14	45

Origin	Destination	Cost
9	1	29
9	2	30



9	3	17
9	4	23
9	5	30
9	6	43
9	7	43
9	8	35
9	9	0
9	10	15
9	11	63
9	12	57
9	13	23
9	14	32

Origin	Destination	Cost
10	1	23



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10	2	19
10	3	11
10	4	25
10	5	25
10	6	34
10	7	39
10	8	22
10	9	15
10	10	0
10	11	53
10	12	60
10	13	25
10	14	35

Origin	Destination	Cost
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11	1	46
11	2	48
11	3	55
11	4	48
11	5	32
11	6	43
11	7	32
11	8	57
11	9	64
11	10	60
11	11	0
11	12	52
11	13	68
11	14	76



Origin	Destination	Cost
12	1	58
12	2	54
12	3	61
12	4	62
12	5	60
12	6	69
12	7	57
12	8	41
12	9	61
12	10	55
12	11	37
12	12	0
12	13	58
12	14	62



Origin	Destination	Cost
13	1	34
13	2	29
13	3	38
13	4	36
13	5	37
13	6	45
13	7	51
13	8	36
13	9	27
13	10	32
13	11	62
13	12	52
13	13	0
13	14	18



Origin	Destination	Cost
14	1	44
14	2	39
14	3	30
14	4	35
14	5	42
14	6	54
14	7	55
14	8	45
14	9	33
14	10	33
14	11	75
14	12	61
14	13	18
14	14	0



Given Base Year Trip Matrix		
Origin	Destination	No. of Trips
1	1	428.6155
1	2	157.97045
1	3	157.97045
1	4	157.97045
1	5	315.9409
1	6	157.97045
1	7	220.6443
1	8	147.6446
1	9	157.97045
1	10	157.97045
1	11	157.97045
1	12	157.97045
1	13	157.97045



1	14	157.97045
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Origin	Destination	No. of Trips
2	1	153.9845
2	2	1008.029
2	3	801.4462
2	4	93.64287
2	5	76.99225
2	6	76.99225
2	7	76.99225
2	8	433.5992
2	9	75.28658
2	10	1596.431
2	11	76.99225
2	12	76.99225



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2	13	76.99225
2	14	69.80764

Origin	Destination	No. of Trips
3	1	383.5854
3	2	154.99155
3	3	154.9916
3	4	309.9831
3	5	154.99155
3	6	154.99155
3	7	154.99155
3	8	83.12612
3	9	154.99155
3	10	154.99155
3	11	154.99155



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3	12	154.99155
3	13	154.99155
3	14	284.3276

Origin	Destination	No. of Trips
4	1	105.4877
4	2	105.4877
4	3	105.4877
4	4	71.19773
4	5	210.9754
4	6	363.2069
4	7	105.4877
4	8	127.8796
4	9	105.4877
4	10	2009.018



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4	11	105.4877
4	12	105.4877
4	13	105.4877
4	14	42.00857

Origin	Destination	No. of Trips
5	1	185.2548
5	2	185.2548
5	3	185.2548
5	4	185.2548
5	5	257.4337
5	6	185.2548
5	7	370.5096
5	8	184.532
5	9	185.2548



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5	10	185.2548
5	11	185.2548
5	12	185.2548
5	13	185.2548
5	14	185.2548

Origin	Destination	No. of Trips
6	1	143.17185
6	2	285.0876
6	3	143.17185
6	4	64.61918
6	5	286.3437
6	6	77.14922
6	7	143.17185
6	8	36.4499



6	9	143.17185
6	10	143.17185
6	11	143.17185
6	12	34.0992
6	13	143.17185
6	14	113.2928

Origin	Destination	No. of Trips
7	1	115.23315
7	2	322.3624
7	3	115.23315
7	4	93.00691
7	5	230.4663
7	6	610.409
7	7	746.3546



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7	8	217.1002
7	9	91.68806
7	10	115.23315
7	11	115.23315
7	12	115.23315
7	13	115.23315
7	14	111.8095

Origin	Destination	No. of Trips
8	1	42.93877
8	2	778.9419
8	3	563.5814
8	4	77.34175
8	5	296.5437
8	6	362.968



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8	7	422.5428
8	8	1332.012
8	9	330.249
8	10	1063.762
8	11	389.47095
8	12	48.1849
8	13	410.103
8	14	826.1066

Origin	Destination	No. of Trips
9	1	195.6988
9	2	195.6988
9	3	391.3976
9	4	55.51776
9	5	195.6988



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9	6	195.6988
9	7	178.0494
9	8	271.107
9	9	670.8946
9	10	195.6988
9	11	195.6988
9	12	195.6988
9	13	195.6988
9	14	513.064

Origin	Destination	No. of Trips
10	1	367.0389
10	2	367.0389
10	3	367.0389
10	4	367.0389



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10	5	367.0389
10	6	367.0389
10	7	367.0389
10	8	734.0778
10	9	367.0389
10	10	367.0389
10	11	367.0389
10	12	367.0389
10	13	367.0389
10	14	367.0389

Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0



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11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0

Origin	Destination	No. of Trips
12	1	0
12	2	0



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12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0

Origin	Destination	No. of Trips
13	1	155.0559



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13	2	482.0706
13	3	155.0559
13	4	155.0559
13	5	155.0559
13	6	257.2405
13	7	285.6512
13	8	81.57111
13	9	459.0396
13	10	155.0559
13	11	155.0559
13	12	155.0559
13	13	155.0559
13	14	310.1118

Origin	Destination	No. of Trips
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14	1	127.4274
14	2	127.4274
14	3	96.00859
14	4	30.44989
14	5	127.4274
14	6	108.3454
14	7	127.4274
14	8	237.2254
14	9	318.9888
14	10	127.4274
14	11	127.4274
14	12	28.63854
14	13	254.8548
14	14	155.6117



Sum Totals of Origin		Sum Totals of Destination	
Origin	Totals	Destination	Totals
O1	2692.5498	D1	2403.49267
O2	4694.18049	D2	4170.3611
O3	2610.93777	D3	3236.63814
O4	3668.1878	D4	1661.07924
O5	2850.2781	D5	2674.9085
O6	1899.24455	D6	2917.26577
O7	3114.59587	D7	3198.86155
O8	6944.74677	D8	3886.32493
O9	3645.62076	D9	3060.06189
O10	5505.5835	D10	6271.0538
O11	0	D11	2173.7937
O12	0	D12	1624.64614
O13	3116.13201	D13	2321.85315



O14	1994.68752	D14	3136.40436
-----	------------	-----	------------

Selected Frictional Functions : Power Function [$F_{ij} = C_{ij}^B$]

Solution :

Trip Matrix with respect to Optimal Beta Value (Minimum SSE)		
Origin	Destination	No. of Trips
1	1	0
1	2	278
1	3	216
1	4	110
1	5	178
1	6	194
1	7	213



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1	8	259
1	9	204
1	10	418
1	11	145
1	12	108
1	13	155
1	14	209

Origin	Destination	No. of Trips
2	1	292
2	2	0
2	3	393
2	4	202
2	5	325
2	6	355



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2	7	389
2	8	472
2	9	372
2	10	763
2	11	264
2	12	197
2	13	282
2	14	381

Origin	Destination	No. of Trips
3	1	158
3	2	275
3	3	0
3	4	109
3	5	176



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3	6	192
3	7	211
3	8	256
3	9	202
3	10	414
3	11	143
3	12	107
3	13	153
3	14	207

Origin	Destination	No. of Trips
4	1	214
4	2	372
4	3	288
4	4	0



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4	5	238
4	6	260
4	7	285
4	8	347
4	9	273
4	10	560
4	11	194
4	12	145
4	13	207
4	14	280

Origin	Destination	No. of Trips
5	1	170
5	2	296
5	3	230



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5	4	118
5	5	0
5	6	207
5	7	227
5	8	276
5	9	217
5	10	446
5	11	154
5	12	115
5	13	165
5	14	223

Origin	Destination	No. of Trips
6	1	114
6	2	198



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6	3	154
6	4	79
6	5	127
6	6	0
6	7	152
6	8	185
6	9	145
6	10	299
6	11	103
6	12	77
6	13	110
6	14	149

Origin	Destination	No. of Trips
7	1	189



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7	2	328
7	3	254
7	4	130
7	5	210
7	6	229
7	7	0
7	8	306
7	9	241
7	10	494
7	11	171
7	12	128
7	13	182
7	14	247

Origin	Destination	No. of Trips
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8	1	429
8	2	744
8	3	578
8	4	296
8	5	478
8	6	521
8	7	572
8	8	0
8	9	546
8	10	1120
8	11	388
8	12	290
8	13	415
8	14	560



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Origin	Destination	No. of Trips
9	1	220
9	2	383
9	3	297
9	4	152
9	5	245
9	6	268
9	7	294
9	8	357
9	9	0
9	10	575
9	11	199
9	12	149
9	13	213
9	14	288



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Origin	Destination	No. of Trips
10	1	362
10	2	629
10	3	488
10	4	250
10	5	403
10	6	440
10	7	483
10	8	586
10	9	461
10	10	0
10	11	328
10	12	245
10	13	350
10	14	473



Origin	Destination	No. of Trips
11	1	0
11	2	0
11	3	0
11	4	0
11	5	0
11	6	0
11	7	0
11	8	0
11	9	0
11	10	0
11	11	0
11	12	0
11	13	0
11	14	0



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Origin	Destination	No. of Trips
12	1	0
12	2	0
12	3	0
12	4	0
12	5	0
12	6	0
12	7	0
12	8	0
12	9	0
12	10	0
12	11	0
12	12	0
12	13	0
12	14	0



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Origin	Destination	No. of Trips
13	1	185
13	2	321
13	3	249
13	4	128
13	5	206
13	6	224
13	7	246
13	8	299
13	9	235
13	10	483
13	11	167
13	12	125
13	13	0
13	14	241



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Origin	Destination	No. of Trips
14	1	121
14	2	210
14	3	162
14	4	83
14	5	134
14	6	146
14	7	161
14	8	195
14	9	154
14	10	315
14	11	109
14	12	81
14	13	116
14	14	0



Minimum Residual = 10282250.068479

Optimal Beta = 0.001

Target Oi	Modelled Oi	Target Dj	Modelled Dj
2692.5498	2692.5498	2403.49267	2460.0176753688
4694.18049	4694.18049	4170.3611	4039.1077692164
2610.93777	2610.93777	3236.63814	3315.1327320186
3668.1878	3668.1878	1661.07924	1662.9141491183
2850.2781	2850.2781	2674.9085	2726.3350472407
1899.24455	1899.24455	2917.26577	3042.7935060452
3114.59587	3114.59587	3198.86155	3237.4457270395
6944.74677	6944.74677	3886.32493	3543.5787054569
3645.62076	3645.62076	3060.06189	3055.8678582184
5505.5835	5505.5835	6271.0538	5891.3593019328
0	0	2173.7937	2371.8940467913
0	0	1624.64614	1773.1896787308



3116.13201	3116.13201	2321.85315	2353.3740445924
1994.68752	1994.68752	3136.40436	3263.7346982298

Beta	Residual SSE
0.001	10282250.068479
0.002	10282250.068479
0.003	10282250.068479
0.004	10282250.068479
0.005	10282250.068479
0.006	10282250.068479
0.007	10282250.068479
0.008	10282250.068479
0.009	10282250.068479
0.01	10282250.068479



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0.011	10282250.068479
0.012	10282250.068479
0.013	10282250.068479
0.014	10282250.068479
0.015	10282250.068479
0.016	10282250.068479
0.017	10282250.068479
0.018	10282250.068479
0.019	10282250.068479
0.02	10282250.068479
0.021	10282250.068479
0.022	10282250.068479
0.023	10282250.068479
0.024	10282250.068479
0.025	10282250.068479



0.026	10282250.068479
0.027	10282250.068479
0.028	10282250.068479
0.029	10282250.068479
0.03	10282250.068479
0.031	10282250.068479
0.032	10282250.068479
0.033	10282250.068479
0.034	10282250.068479
0.035	10282250.068479
0.036	10282250.068479
0.037	10282250.068479
0.038	10282250.068479
0.039	10282250.068479
0.04	10282250.068479



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0.041	10282250.068479
0.042	10282250.068479
0.043	10282250.068479
0.044	10282250.068479
0.045	10282250.068479
0.046	10282250.068479
0.047	10282250.068479
0.048	10282250.068479
0.049	10282250.068479
0.05	10282250.068479
0.051	10282250.068479
0.052	10282250.068479
0.053	10282250.068479
0.054	10282250.068479
0.055	10282250.068479



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0.056	10282250.068479
0.057	10282250.068479
0.058	10282250.068479
0.059	10282250.068479
0.06	10282250.068479
0.061	10282250.068479
0.062	10282250.068479
0.063	10282250.068479
0.064	10282250.068479
0.065	10282250.068479
0.066	10282250.068479
0.067	10282250.068479
0.068	10282250.068479
0.069	10282250.068479
0.07	10282250.068479



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0.071	10282250.068479
0.072	10282250.068479
0.073	10282250.068479
0.074	10282250.068479
0.075	10282250.068479
0.076	10282250.068479
0.077	10282250.068479
0.078	10282250.068479
0.079	10282250.068479
0.08	10282250.068479
0.081	10282250.068479
0.082	10282250.068479
0.083	10282250.068479
0.084	10282250.068479
0.085	10282250.068479



0.086	10282250.068479
0.087	10282250.068479
0.088	10282250.068479
0.089	10282250.068479
0.09	10282250.068479
0.091	10282250.068479
0.092	10282250.068479
0.093	10282250.068479
0.094	10282250.068479
0.095	10282250.068479
0.096	10282250.068479
0.097	10282250.068479
0.098	10282250.068479
0.099	10282250.068479
0.1	10282250.068479



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0.101	10282250.068479
0.102	10282250.068479
0.103	10282250.068479
0.104	10282250.068479
0.105	10282250.068479
0.106	10282250.068479
0.107	10282250.068479
0.108	10282250.068479
0.109	10282250.068479
0.11	10282250.068479
0.111	10282250.068479
0.112	10282250.068479
0.113	10282250.068479
0.114	10282250.068479
0.115	10282250.068479



0.116	10282250.068479
0.117	10282250.068479
0.118	10282250.068479
0.119	10282250.068479
0.12	10282250.068479
0.121	10282250.068479
0.122	10282250.068479
0.123	10282250.068479
0.124	10282250.068479
0.125	10282250.068479
0.126	10282250.068479
0.127	10282250.068479
0.128	10282250.068479
0.129	10282250.068479
0.13	10282250.068479



0.131	10282250.068479
0.132	10282250.068479
0.133	10282250.068479
0.134	10282250.068479
0.135	10282250.068479
0.136	10282250.068479
0.137	10282250.068479
0.138	10282250.068479
0.139	10282250.068479
0.14	10282250.068479
0.141	10282250.068479
0.142	10282250.068479
0.143	10282250.068479
0.144	10282250.068479
0.145	10282250.068479



0.146	10282250.068479
0.147	10282250.068479
0.148	10282250.068479
0.149	10282250.068479
0.15	10282250.068479
0.151	10282250.068479
0.152	10282250.068479
0.153	10282250.068479
0.154	10282250.068479
0.155	10282250.068479
0.156	10282250.068479
0.157	10282250.068479
0.158	10282250.068479
0.159	10282250.068479
0.16	10282250.068479



0.161	10282250.068479
0.162	10282250.068479
0.163	10282250.068479
0.164	10282250.068479
0.165	10282250.068479
0.166	10282250.068479
0.167	10282250.068479
0.168	10282250.068479
0.169	10282250.068479
0.17	10282250.068479
0.171	10282250.068479
0.172	10282250.068479
0.173	10282250.068479
0.174	10282250.068479
0.175	10282250.068479



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0.176	10282250.068479
0.177	10282250.068479
0.178	10282250.068479
0.179	10282250.068479
0.18	10282250.068479
0.181	10282250.068479
0.182	10282250.068479
0.183	10282250.068479
0.184	10282250.068479
0.185	10282250.068479
0.186	10282250.068479
0.187	10282250.068479
0.188	10282250.068479
0.189	10282250.068479
0.19	10282250.068479



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0.191	10282250.068479
0.192	10282250.068479
0.193	10282250.068479
0.194	10282250.068479
0.195	10282250.068479
0.196	10282250.068479
0.197	10282250.068479
0.198	10282250.068479
0.199	10282250.068479
0.2	10282250.068479
0.201	10282250.068479
0.202	10282250.068479
0.203	10282250.068479
0.204	10282250.068479
0.205	10282250.068479



0.206	10282250.068479
0.207	10282250.068479
0.208	10282250.068479
0.209	10282250.068479
0.21	10282250.068479
0.211	10282250.068479
0.212	10282250.068479
0.213	10282250.068479
0.214	10282250.068479
0.215	10282250.068479
0.216	10282250.068479
0.217	10282250.068479
0.218	10282250.068479
0.219	10282250.068479
0.22	10282250.068479



0.221	10282250.068479
0.222	10282250.068479
0.223	10282250.068479
0.224	10282250.068479
0.225	10282250.068479
0.226	10282250.068479
0.227	10282250.068479
0.228	10282250.068479
0.229	10282250.068479
0.23	10282250.068479
0.231	10282250.068479
0.232	10282250.068479
0.233	10282250.068479
0.234	10282250.068479
0.235	10282250.068479



0.236	10282250.068479
0.237	10282250.068479
0.238	10282250.068479
0.239	10282250.068479
0.24	10282250.068479
0.241	10282250.068479
0.242	10282250.068479
0.243	10282250.068479
0.244	10282250.068479
0.245	10282250.068479
0.246	10282250.068479
0.247	10282250.068479
0.248	10282250.068479
0.249	10282250.068479
0.25	10282250.068479



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0.251	10282250.068479
0.252	10282250.068479
0.253	10282250.068479
0.254	10282250.068479
0.255	10282250.068479
0.256	10282250.068479
0.257	10282250.068479
0.258	10282250.068479
0.259	10282250.068479
0.26	10282250.068479
0.261	10282250.068479
0.262	10282250.068479
0.263	10282250.068479
0.264	10282250.068479
0.265	10282250.068479



0.266	10282250.068479
0.267	10282250.068479
0.268	10282250.068479
0.269	10282250.068479
0.27	10282250.068479
0.271	10282250.068479
0.272	10282250.068479
0.273	10282250.068479
0.274	10282250.068479
0.275	10282250.068479
0.276	10282250.068479
0.277	10282250.068479
0.278	10282250.068479
0.279	10282250.068479
0.28	10282250.068479



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0.281	10282250.068479
0.282	10282250.068479
0.283	10282250.068479
0.284	10282250.068479
0.285	10282250.068479
0.286	10282250.068479
0.287	10282250.068479
0.288	10282250.068479
0.289	10282250.068479
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0.97	10282250.068479



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