

Report

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Experiment No. 8

Calibration Of Doubly Constrained Gravity Model

October 30, 2021, 7:25 pm

Input Values :

Base Year Origin-Destination Cost Matrix		
Origin	Destination	Cost
1	1	28
1	2	23
1	3	28
1	4	24
1	5	31
1	6	35
1	7	31
1	8	41
1	9	22
1	10	38



1	11	46
1	12	32
1	13	41
1	14	45
1	15	35
1	16	34
1	17	39
1	18	33
1	19	76
1	20	55
1	21	35
1	22	38
1	23	48
1	24	52
1	25	44



1	26	41
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Origin	Destination	Cost
2	1	29
2	2	26
2	3	27
2	4	23
2	5	39
2	6	34
2	7	28
2	8	40
2	9	34
2	10	35
2	11	33
2	12	46



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2	13	31
2	14	47
2	15	33
2	16	20
2	17	71
2	18	45
2	19	35
2	20	46
2	21	45
2	22	35
2	23	50
2	24	60
2	25	67
2	26	43



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Origin	Destination	Cost
3	1	31
3	2	31
3	3	20
3	4	24
3	5	28
3	6	29
3	7	24
3	8	27
3	9	24
3	10	29
3	11	30
3	12	33
3	13	40
3	14	36



3	15	34
3	16	31
3	17	29
3	18	28
3	19	37
3	20	41
3	21	44
3	22	38
3	23	45
3	24	41
3	25	45
3	26	47

Origin	Destination	Cost
4	1	31



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4	2	24
4	3	24
4	4	20
4	5	24
4	6	29
4	7	24
4	8	28
4	9	27
4	10	33
4	11	30
4	12	34
4	13	38
4	14	36
4	15	33
4	16	42



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4	17	38
4	18	40
4	19	39
4	20	35
4	21	38
4	22	35
4	23	48
4	24	60
4	25	63
4	26	53

Origin	Destination	Cost
5	1	37
5	2	38
5	3	33



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5	4	24
5	5	22
5	6	31
5	7	27
5	8	28
5	9	29
5	10	36
5	11	30
5	12	35
5	13	39
5	14	36
5	15	31
5	16	41
5	17	41
5	18	57



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5	19	41
5	20	49
5	21	56
5	22	43
5	23	39
5	24	47
5	25	52
5	26	53

Origin	Destination	Cost
6	1	40
6	2	35
6	3	29
6	4	31
6	5	33



6	6	20
6	7	26
6	8	32
6	9	33
6	10	27
6	11	25
6	12	21
6	13	23
6	14	28
6	15	29
6	16	27
6	17	42
6	18	32
6	19	34
6	20	31



6	21	25
6	22	34
6	23	32
6	24	45
6	25	52
6	26	42

Origin	Destination	Cost
7	1	32
7	2	33
7	3	27
7	4	28
7	5	28
7	6	23
7	7	20



7	8	29
7	9	24
7	10	24
7	11	24
7	12	23
7	13	29
7	14	26
7	15	30
7	16	34
7	17	43
7	18	30
7	19	34
7	20	32
7	21	32
7	22	41



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7	23	30
7	24	38
7	25	39
7	26	37

Origin	Destination	Cost
8	1	41
8	2	39
8	3	25
8	4	25
8	5	32
8	6	32
8	7	26
8	8	25
8	9	25



8	10	22
8	11	28
8	12	37
8	13	39
8	14	39
8	15	34
8	16	28
8	17	31
8	18	45
8	19	51
8	20	50
8	21	42
8	22	41
8	23	57
8	24	53



8	25	48
8	26	47

Origin	Destination	Cost
9	1	24
9	2	34
9	3	23
9	4	24
9	5	40
9	6	30
9	7	25
9	8	27
9	9	19
9	10	22
9	11	26



9	12	33
9	13	39
9	14	34
9	15	31
9	16	26
9	17	34
9	18	29
9	19	40
9	20	37
9	21	43
9	22	50
9	23	43
9	24	38
9	25	47
9	26	49



Origin	Destination	Cost
10	1	39
10	2	29
10	3	30
10	4	29
10	5	38
10	6	25
10	7	20
10	8	27
10	9	22
10	10	20
10	11	23
10	12	25
10	13	34
10	14	38



10	15	27
10	16	25
10	17	37
10	18	25
10	19	35
10	20	37
10	21	37
10	22	45
10	23	41
10	24	46
10	25	40
10	26	48

Origin	Destination	Cost
11	1	50



11	2	47
11	3	30
11	4	31
11	5	33
11	6	23
11	7	24
11	8	28
11	9	26
11	10	23
11	11	20
11	12	23
11	13	25
11	14	24
11	15	26
11	16	22



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11	17	30
11	18	31
11	19	30
11	20	28
11	21	29
11	22	37
11	23	31
11	24	36
11	25	37
11	26	33

Origin	Destination	Cost
12	1	35
12	2	40
12	3	35



12	4	33
12	5	33
12	6	22
12	7	27
12	8	36
12	9	34
12	10	27
12	11	25
12	12	18
12	13	20
12	14	20
12	15	24
12	16	31
12	17	35
12	18	29



12	19	30
12	20	27
12	21	23
12	22	28
12	23	27
12	24	41
12	25	36
12	26	31

Origin	Destination	Cost
13	1	46
13	2	49
13	3	42
13	4	39
13	5	42



13	6	23
13	7	30
13	8	39
13	9	40
13	10	34
13	11	27
13	12	21
13	13	18
13	14	20
13	15	28
13	16	33
13	17	40
13	18	32
13	19	33
13	20	25



13	21	21
13	22	27
13	23	31
13	24	38
13	25	40
13	26	33

Origin	Destination	Cost
14	1	44
14	2	39
14	3	40
14	4	34
14	5	46
14	6	25
14	7	26



14	8	35
14	9	38
14	10	27
14	11	23
14	12	18
14	13	19
14	14	15
14	15	19
14	16	25
14	17	35
14	18	34
14	19	20
14	20	20
14	21	23
14	22	27



14	23	22
14	24	34
14	25	31
14	26	29

Origin	Destination	Cost
15	1	49
15	2	52
15	3	35
15	4	35
15	5	43
15	6	30
15	7	29
15	8	32
15	9	32



15	10	29
15	11	24
15	12	24
15	13	29
15	14	20
15	15	21
15	16	24
15	17	26
15	18	28
15	19	26
15	20	27
15	21	27
15	22	32
15	23	25
15	24	30



15	25	34
15	26	39

Origin	Destination	Cost
16	1	36
16	2	33
16	3	32
16	4	41
16	5	41
16	6	28
16	7	26
16	8	30
16	9	28
16	10	25
16	11	32



16	12	31
16	13	28
16	14	27
16	15	24
16	16	27
16	17	30
16	18	24
16	19	32
16	20	30
16	21	33
16	22	38
16	23	35
16	24	43
16	25	39
16	26	38



Origin	Destination	Cost
17	1	29
17	2	10
17	3	24
17	4	29
17	5	50
17	6	41
17	7	42
17	8	31
17	9	37
17	10	37
17	11	27
17	12	35
17	13	42
17	14	34



17	15	23
17	16	27
17	17	22
17	18	32
17	19	25
17	20	50
17	21	48
17	22	52
17	23	42
17	24	42
17	25	90
17	26	60

Origin	Destination	Cost
18	1	39



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18	2	65
18	3	32
18	4	41
18	5	42
18	6	51
18	7	28
18	8	35
18	9	30
18	10	26
18	11	27
18	12	27
18	13	32
18	14	30
18	15	27
18	16	23



18	17	33
18	18	17
18	19	32
18	20	26
18	21	36
18	22	45
18	23	29
18	24	34
18	25	39
18	26	40

Origin	Destination	Cost
19	1	41
19	2	39
19	3	36



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19	4	43
19	5	38
19	6	36
19	7	33
19	8	52
19	9	41
19	10	40
19	11	29
19	12	27
19	13	35
19	14	19
19	15	26
19	16	29
19	17	58
19	18	30



19	19	20
19	20	32
19	21	28
19	22	33
19	23	31
19	24	36
19	25	33
19	26	29

Origin	Destination	Cost
20	1	50
20	2	57
20	3	42
20	4	36
20	5	54



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20	6	30
20	7	30
20	8	48
20	9	41
20	10	35
20	11	28
20	12	25
20	13	25
20	14	19
20	15	25
20	16	33
20	17	75
20	18	29
20	19	29
20	20	25



20	21	25
20	22	29
20	23	21
20	24	29
20	25	35
20	26	30

Origin	Destination	Cost
21	1	41
21	2	47
21	3	48
21	4	43
21	5	46
21	6	27
21	7	32



21	8	43
21	9	44
21	10	38
21	11	30
21	12	24
21	13	20
21	14	23
21	15	29
21	16	33
21	17	50
21	18	36
21	19	30
21	20	24
21	21	21
21	22	22



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21	23	26
21	24	44
21	25	41
21	26	27

Origin	Destination	Cost
22	1	36
22	2	45
22	3	44
22	4	36
22	5	45
22	6	30
22	7	36
22	8	41
22	9	51



22	10	68
22	11	40
22	12	29
22	13	23
22	14	31
22	15	33
22	16	37
22	17	53
22	18	54
22	19	33
22	20	28
22	21	21
22	22	16
22	23	25
22	24	30



22	25	30
22	26	29

Origin	Destination	Cost
23	1	41
23	2	55
23	3	41
23	4	45
23	5	53
23	6	30
23	7	31
23	8	48
23	9	54
23	10	39
23	11	31



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23	12	27
23	13	29
23	14	21
23	15	26
23	16	34
23	17	36
23	18	38
23	19	28
23	20	20
23	21	25
23	22	26
23	23	18
23	24	20
23	25	25
23	26	23



Origin	Destination	Cost
24	1	47
24	2	60
24	3	52
24	4	36
24	5	75
24	6	42
24	7	35
24	8	53
24	9	31
24	10	48
24	11	34
24	12	33
24	13	41
24	14	30



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24	15	30
24	16	43
24	17	57
24	18	33
24	19	35
24	20	26
24	21	44
24	22	30
24	23	29
24	24	20
24	25	27
24	26	36

Origin	Destination	Cost
25	1	41



25	2	80
25	3	48
25	4	56
25	5	50
25	6	45
25	7	35
25	8	46
25	9	51
25	10	40
25	11	33
25	12	35
25	13	36
25	14	30
25	15	31
25	16	38



25	17	52
25	18	37
25	19	31
25	20	29
25	21	40
25	22	28
25	23	28
25	24	28
25	25	23
25	26	22

Origin	Destination	Cost
26	1	70
26	2	65
26	3	50



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26	4	55
26	5	58
26	6	33
26	7	39
26	8	53
26	9	50
26	10	39
26	11	35
26	12	31
26	13	33
26	14	27
26	15	39
26	16	39
26	17	60
26	18	37



26	19	27
26	20	29
26	21	30
26	22	24
26	23	25
26	24	40
26	25	25
26	26	21

Given Base Year Trip Matrix		
Origin	Destination	No. of Trips



1	1	3413
1	2	126
1	3	231
1	4	384
1	5	91
1	6	231
1	7	301
1	8	0
1	9	0
1	10	45
1	11	114
1	12	45
1	13	174
1	14	23
1	15	57



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1	16	92
1	17	0
1	18	0
1	19	22
1	20	0
1	21	69
1	22	10
1	23	10
1	24	11
1	25	0
1	26	79

Origin	Destination	No. of Trips
2	1	151
2	2	564



2	3	729
2	4	507
2	5	188
2	6	586
2	7	1293
2	8	71
2	9	258
2	10	71
2	11	620
2	12	565
2	13	1263
2	14	118
2	15	163
2	16	188
2	17	0



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2	18	23
2	19	47
2	20	0
2	21	318
2	22	22
2	23	224
2	24	0
2	25	0
2	26	143

Origin	Destination	No. of Trips
3	1	435
3	2	289
3	3	1806
3	4	1207



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3	5	579
3	6	3639
3	7	2733
3	8	342
3	9	532
3	10	377
3	11	1168
3	12	1142
3	13	3200
3	14	297
3	15	1115
3	16	480
3	17	81
3	18	114
3	19	204



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3	20	102
3	21	986
3	22	0
3	23	204
3	24	0
3	25	266
3	26	528

Origin	Destination	No. of Trips
4	1	29
4	2	105
4	3	507
4	4	1030
4	5	188
4	6	1063



4	7	922
4	8	58
4	9	69
4	10	70
4	11	402
4	12	726
4	13	1886
4	14	324
4	15	437
4	16	176
4	17	0
4	18	23
4	19	284
4	20	131
4	21	527



4	22	23
4	23	139
4	24	94
4	25	23
4	26	103

Origin	Destination	No. of Trips
5	1	106
5	2	170
5	3	370
5	4	984
5	5	2001
5	6	1784
5	7	1737
5	8	251



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5	9	196
5	10	173
5	11	237
5	12	565
5	13	1561
5	14	303
5	15	374
5	16	210
5	17	15
5	18	86
5	19	51
5	20	89
5	21	513
5	22	2
5	23	203



5	24	0
5	25	112
5	26	60

Origin	Destination	No. of Trips
6	1	50
6	2	0
6	3	48
6	4	257
6	5	48
6	6	1940
6	7	454
6	8	144
6	9	118
6	10	25



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6	11	319
6	12	998
6	13	3683
6	14	290
6	15	702
6	16	187
6	17	0
6	18	48
6	19	370
6	20	150
6	21	1594
6	22	267
6	23	194
6	24	25
6	25	25



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6	26	250
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Origin	Destination	No. of Trips
7	1	147
7	2	46
7	3	420
7	4	237
7	5	302
7	6	1727
7	7	969
7	8	242
7	9	121
7	10	364
7	11	1182
7	12	1294



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7	13	1903
7	14	750
7	15	889
7	16	185
7	17	0
7	18	83
7	19	369
7	20	193
7	21	1499
7	22	135
7	23	282
7	24	24
7	25	49
7	26	229



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Origin	Destination	No. of Trips
8	1	102
8	2	136
8	3	715
8	4	341
8	5	204
8	6	2577
8	7	1795
8	8	774
8	9	331
8	10	340
8	11	680
8	12	895
8	13	2334
8	14	272



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8	15	1013
8	16	613
8	17	0
8	18	34
8	19	238
8	20	238
8	21	1232
8	22	136
8	23	191
8	24	102
8	25	170
8	26	340

Origin	Destination	No. of Trips
9	1	0



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9	2	142
9	3	574
9	4	234
9	5	116
9	6	2001
9	7	2037
9	8	189
9	9	382
9	10	1073
9	11	1558
9	12	899
9	13	2396
9	14	678
9	15	997
9	16	835



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9	17	68
9	18	400
9	19	427
9	20	173
9	21	1194
9	22	159
9	23	213
9	24	71
9	25	213
9	26	607

Origin	Destination	No. of Trips
10	1	121
10	2	0
10	3	333



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10	4	89
10	5	162
10	6	1311
10	7	1624
10	8	116
10	9	293
10	10	1034
10	11	926
10	12	928
10	13	2741
10	14	498
10	15	1244
10	16	1377
10	17	58
10	18	118



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10	19	84
10	20	325
10	21	939
10	22	89
10	23	118
10	24	63
10	25	294
10	26	469

Origin	Destination	No. of Trips
11	1	64
11	2	161
11	3	472
11	4	115
11	5	107



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11	6	1676
11	7	787
11	8	248
11	9	151
11	10	160
11	11	2521
11	12	1091
11	13	4171
11	14	788
11	15	774
11	16	868
11	17	25
11	18	96
11	19	403
11	20	302



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11	21	870
11	22	66
11	23	352
11	24	143
11	25	288
11	26	531

Origin	Destination	No. of Trips
12	1	0
12	2	54
12	3	9
12	4	0
12	5	0
12	6	833
12	7	314



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12	8	19
12	9	10
12	10	25
12	11	191
12	12	612
12	13	1725
12	14	439
12	15	200
12	16	71
12	17	0
12	18	15
12	19	173
12	20	184
12	21	623
12	22	25



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12	23	55
12	24	9
12	25	62
12	26	181

Origin	Destination	No. of Trips
13	1	0
13	2	73
13	3	35
13	4	49
13	5	0
13	6	784
13	7	215
13	8	107
13	9	78



13	10	185
13	11	111
13	12	856
13	13	1224
13	14	284
13	15	281
13	16	108
13	17	15
13	18	0
13	19	47
13	20	101
13	21	482
13	22	33
13	23	89
13	24	0



13	25	68
13	26	134

Origin	Destination	No. of Trips
14	1	16
14	2	0
14	3	52
14	4	36
14	5	88
14	6	638
14	7	264
14	8	77
14	9	23
14	10	100
14	11	374



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14	12	408
14	13	1538
14	14	593
14	15	385
14	16	90
14	17	44
14	18	0
14	19	360
14	20	146
14	21	471
14	22	59
14	23	151
14	24	37
14	25	81
14	26	190



Origin	Destination	No. of Trips
15	1	49
15	2	0
15	3	120
15	4	24
15	5	24
15	6	813
15	7	458
15	8	142
15	9	86
15	10	58
15	11	802
15	12	656
15	13	2228
15	14	1041



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15	15	1144
15	16	344
15	17	0
15	18	206
15	19	328
15	20	262
15	21	436
15	22	55
15	23	175
15	24	72
15	25	174
15	26	285

Origin	Destination	No. of Trips
16	1	50



16	2	50
16	3	173
16	4	176
16	5	50
16	6	815
16	7	596
16	8	93
16	9	76
16	10	499
16	11	980
16	12	714
16	13	1206
16	14	236
16	15	690
16	16	964



16	17	77
16	18	114
16	19	159
16	20	164
16	21	603
16	22	110
16	23	50
16	24	151
16	25	91
16	26	255

Origin	Destination	No. of Trips
17	1	61
17	2	15
17	3	677



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17	4	86
17	5	46
17	6	207
17	7	208
17	8	50
17	9	77
17	10	180
17	11	344
17	12	93
17	13	239
17	14	86
17	15	177
17	16	438
17	17	80
17	18	30



17	19	24
17	20	0
17	21	303
17	22	9
17	23	78
17	24	18
17	25	0
17	26	43

Origin	Destination	No. of Trips
18	1	0
18	2	19
18	3	25
18	4	15
18	5	45



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18	6	186
18	7	224
18	8	0
18	9	58
18	10	135
18	11	196
18	12	323
18	13	845
18	14	432
18	15	646
18	16	562
18	17	38
18	18	330
18	19	213
18	20	97



18	21	351
18	22	19
18	23	106
18	24	38
18	25	71
18	26	219

Origin	Destination	No. of Trips
19	1	49
19	2	33
19	3	101
19	4	16
19	5	17
19	6	437
19	7	296



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19	8	17
19	9	81
19	10	108
19	11	201
19	12	350
19	13	1300
19	14	498
19	15	792
19	16	227
19	17	34
19	18	183
19	19	521
19	20	283
19	21	177
19	22	34



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19	23	135
19	24	62
19	25	124
19	26	98

Origin	Destination	No. of Trips
20	1	0
20	2	0
20	3	93
20	4	67
20	5	57
20	6	1494
20	7	523
20	8	0
20	9	0



20	10	247
20	11	531
20	12	980
20	13	2327
20	14	854
20	15	596
20	16	395
20	17	0
20	18	64
20	19	391
20	20	400
20	21	550
20	22	67
20	23	194
20	24	44



20	25	0
20	26	531

Origin	Destination	No. of Trips
21	1	121
21	2	0
21	3	25
21	4	48
21	5	23
21	6	1304
21	7	514
21	8	117
21	9	47
21	10	121
21	11	377



21	12	1421
21	13	4354
21	14	424
21	15	365
21	16	221
21	17	9
21	18	60
21	19	113
21	20	104
21	21	1228
21	22	611
21	23	220
21	24	16
21	25	108
21	26	258



Origin	Destination	No. of Trips
22	1	107
22	2	0
22	3	24
22	4	21
22	5	0
22	6	886
22	7	158
22	8	133
22	9	24
22	10	21
22	11	491
22	12	425
22	13	1653
22	14	346



22	15	273
22	16	173
22	17	46
22	18	23
22	19	159
22	20	140
22	21	1256
22	22	896
22	23	225
22	24	0
22	25	117
22	26	479

Origin	Destination	No. of Trips
23	1	134



23	2	18
23	3	111
23	4	120
23	5	26
23	6	479
23	7	202
23	8	18
23	9	61
23	10	37
23	11	358
23	12	673
23	13	1744
23	14	335
23	15	226
23	16	80



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23	17	0
23	18	0
23	19	155
23	20	166
23	21	640
23	22	105
23	23	259
23	24	31
23	25	192
23	26	354

Origin	Destination	No. of Trips
24	1	0
24	2	0
24	3	0



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24	4	0
24	5	0
24	6	161
24	7	186
24	8	67
24	9	22
24	10	78
24	11	344
24	12	49
24	13	258
24	14	285
24	15	229
24	16	168
24	17	0
24	18	97



24	19	359
24	20	81
24	21	238
24	22	118
24	23	31
24	24	681
24	25	351
24	26	254

Origin	Destination	No. of Trips
25	1	345
25	2	65
25	3	131
25	4	107
25	5	98



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25	6	389
25	7	1869
25	8	32
25	9	65
25	10	368
25	11	986
25	12	772
25	13	1754
25	14	921
25	15	866
25	16	516
25	17	0
25	18	417
25	19	976
25	20	378



25	21	1000
25	22	468
25	23	639
25	24	616
25	25	2242
25	26	1245

Origin	Destination	No. of Trips
26	1	32
26	2	0
26	3	0
26	4	10
26	5	32
26	6	144
26	7	159



26	8	19
26	9	19
26	10	54
26	11	113
26	12	126
26	13	702
26	14	243
26	15	52
26	16	54
26	17	0
26	18	17
26	19	95
26	20	152
26	21	187
26	22	184



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26	23	234
26	24	78
26	25	222
26	26	650

Sum Totals of Origin		Sum Totals of Destination	
Origin	Totals	Destination	Totals
O1	5528	D1	5582
O2	8112	D2	2066
O3	21826	D3	7781
O4	9339	D4	6160
O5	12153	D5	4492
O6	12186	D6	28105



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O7	13641	D7	20838
O8	15803	D8	3326
O9	17636	D9	3178
O10	15354	D10	5948
O11	17230	D11	16126
O12	5829	D12	17606
O13	5359	D13	48409
O14	6221	D14	11358
O15	9982	D15	14687
O16	9142	D16	9622
O17	3569	D17	590
O18	5193	D18	2581
O19	6174	D19	6572
O20	10405	D20	4361
O21	12209	D21	18286



O22	8076	D22	3702
O23	6524	D23	4771
O24	4057	D24	2386
O25	17265	D25	5343
O26	3578	D26	8515

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	117
1	2	43
1	3	163



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1	4	129
1	5	94
1	6	592
1	7	438
1	8	70
1	9	66
1	10	125
1	11	339
1	12	370
1	13	1019
1	14	239
1	15	309
1	16	202
1	17	12
1	18	54



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1	19	138
1	20	91
1	21	385
1	22	77
1	23	100
1	24	50
1	25	112
1	26	179

Origin	Destination	No. of Trips
2	1	172
2	2	63
2	3	240
2	4	190
2	5	138



2	6	868
2	7	644
2	8	102
2	9	98
2	10	183
2	11	498
2	12	544
2	13	1496
2	14	351
2	15	454
2	16	297
2	17	18
2	18	79
2	19	203
2	20	134



2	21	565
2	22	114
2	23	147
2	24	73
2	25	165
2	26	263

Origin	Destination	No. of Trips
3	1	464
3	2	171
3	3	646
3	4	512
3	5	373
3	6	2337
3	7	1732



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3	8	276
3	9	264
3	10	494
3	11	1341
3	12	1464
3	13	4027
3	14	944
3	15	1221
3	16	800
3	17	49
3	18	214
3	19	546
3	20	362
3	21	1521
3	22	307



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3	23	396
3	24	198
3	25	444
3	26	708

Origin	Destination	No. of Trips
4	1	198
4	2	73
4	3	276
4	4	219
4	5	159
4	6	1000
4	7	741
4	8	118
4	9	113



4	10	211
4	11	573
4	12	626
4	13	1723
4	14	404
4	15	522
4	16	342
4	17	21
4	18	91
4	19	233
4	20	155
4	21	650
4	22	131
4	23	169
4	24	84



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4	25	190
4	26	303

Origin	Destination	No. of Trips
5	1	258
5	2	95
5	3	360
5	4	285
5	5	207
5	6	1301
5	7	964
5	8	154
5	9	147
5	10	275
5	11	746



5	12	815
5	13	2242
5	14	526
5	15	680
5	16	445
5	17	27
5	18	119
5	19	304
5	20	202
5	21	847
5	22	171
5	23	220
5	24	110
5	25	247
5	26	394



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Origin	Destination	No. of Trips
6	1	259
6	2	95
6	3	361
6	4	286
6	5	208
6	6	1304
6	7	967
6	8	154
6	9	147
6	10	276
6	11	748
6	12	817
6	13	2247
6	14	527



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6	15	682
6	16	446
6	17	27
6	18	119
6	19	305
6	20	202
6	21	849
6	22	171
6	23	221
6	24	110
6	25	248
6	26	395

Origin	Destination	No. of Trips
7	1	290



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7	2	107
7	3	404
7	4	320
7	5	233
7	6	1460
7	7	1082
7	8	172
7	9	165
7	10	309
7	11	838
7	12	915
7	13	2516
7	14	590
7	15	763
7	16	500



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7	17	30
7	18	134
7	19	341
7	20	226
7	21	950
7	22	192
7	23	248
7	24	124
7	25	277
7	26	442

Origin	Destination	No. of Trips
8	1	336
8	2	124
8	3	468



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8	4	370
8	5	270
8	6	1692
8	7	1254
8	8	200
8	9	191
8	10	358
8	11	971
8	12	1060
8	13	2915
8	14	684
8	15	884
8	16	579
8	17	35
8	18	155



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8	19	395
8	20	262
8	21	1101
8	22	222
8	23	287
8	24	143
8	25	321
8	26	512

Origin	Destination	No. of Trips
9	1	375
9	2	138
9	3	522
9	4	413
9	5	301



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9	6	1888
9	7	1400
9	8	223
9	9	213
9	10	399
9	11	1083
9	12	1183
9	13	3254
9	14	763
9	15	987
9	16	646
9	17	39
9	18	173
9	19	441
9	20	293



9	21	1229
9	22	248
9	23	320
9	24	160
9	25	359
9	26	572

Origin	Destination	No. of Trips
10	1	326
10	2	120
10	3	455
10	4	360
10	5	262
10	6	1644
10	7	1218



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10	8	194
10	9	185
10	10	347
10	11	943
10	12	1030
10	13	2833
10	14	664
10	15	859
10	16	562
10	17	34
10	18	151
10	19	384
10	20	255
10	21	1070
10	22	216



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10	23	279
10	24	139
10	25	312
10	26	498

Origin	Destination	No. of Trips
11	1	366
11	2	135
11	3	511
11	4	404
11	5	295
11	6	1845
11	7	1368
11	8	218
11	9	208



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11	10	390
11	11	1058
11	12	1155
11	13	3178
11	14	745
11	15	964
11	16	631
11	17	38
11	18	169
11	19	431
11	20	286
11	21	1200
11	22	243
11	23	313
11	24	156



11	25	350
11	26	559

Origin	Destination	No. of Trips
12	1	124
12	2	45
12	3	172
12	4	136
12	5	99
12	6	624
12	7	462
12	8	73
12	9	70
12	10	132
12	11	358



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12	12	390
12	13	1075
12	14	252
12	15	326
12	16	213
12	17	13
12	18	57
12	19	146
12	20	96
12	21	406
12	22	82
12	23	105
12	24	53
12	25	118
12	26	189



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Origin	Destination	No. of Trips
13	1	114
13	2	42
13	3	158
13	4	125
13	5	91
13	6	573
13	7	425
13	8	67
13	9	64
13	10	121
13	11	329
13	12	359
13	13	988
13	14	231



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13	15	299
13	16	196
13	17	12
13	18	52
13	19	134
13	20	89
13	21	373
13	22	75
13	23	97
13	24	48
13	25	109
13	26	173

Origin	Destination	No. of Trips
14	1	132



14	2	49
14	3	184
14	4	146
14	5	106
14	6	666
14	7	494
14	8	78
14	9	75
14	10	141
14	11	382
14	12	417
14	13	1147
14	14	269
14	15	348
14	16	228



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14	17	13
14	18	61
14	19	155
14	20	103
14	21	433
14	22	87
14	23	113
14	24	56
14	25	126
14	26	201

Origin	Destination	No. of Trips
15	1	212
15	2	78
15	3	296



15	4	234
15	5	170
15	6	1069
15	7	792
15	8	126
15	9	120
15	10	226
15	11	613
15	12	669
15	13	1841
15	14	431
15	15	558
15	16	365
15	17	22
15	18	98



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15	19	249
15	20	165
15	21	695
15	22	140
15	23	181
15	24	90
15	25	203
15	26	324

Origin	Destination	No. of Trips
16	1	194
16	2	71
16	3	271
16	4	214
16	5	156



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16	6	979
16	7	725
16	8	115
16	9	110
16	10	207
16	11	561
16	12	613
16	13	1686
16	14	395
16	15	511
16	16	335
16	17	20
16	18	89
16	19	228
16	20	151



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16	21	637
16	22	129
16	23	166
16	24	83
16	25	186
16	26	296

Origin	Destination	No. of Trips
17	1	75
17	2	28
17	3	105
17	4	83
17	5	61
17	6	382
17	7	283



17	8	45
17	9	43
17	10	80
17	11	219
17	12	239
17	13	658
17	14	154
17	15	199
17	16	130
17	17	8
17	18	35
17	19	89
17	20	59
17	21	248
17	22	50



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17	23	64
17	24	32
17	25	72
17	26	115

Origin	Destination	No. of Trips
18	1	110
18	2	40
18	3	153
18	4	121
18	5	88
18	6	556
18	7	412
18	8	65
18	9	62



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18	10	117
18	11	319
18	12	348
18	13	958
18	14	224
18	15	290
18	16	190
18	17	11
18	18	51
18	19	130
18	20	86
18	21	361
18	22	73
18	23	94
18	24	47



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18	25	105
18	26	168

Origin	Destination	No. of Trips
19	1	131
19	2	48
19	3	183
19	4	144
19	5	105
19	6	661
19	7	490
19	8	78
19	9	74
19	10	139
19	11	379



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19	12	414
19	13	1139
19	14	267
19	15	345
19	16	226
19	17	13
19	18	60
19	19	154
19	20	102
19	21	430
19	22	87
19	23	112
19	24	56
19	25	125
19	26	200



Origin	Destination	No. of Trips
20	1	221
20	2	81
20	3	308
20	4	244
20	5	178
20	6	1114
20	7	826
20	8	131
20	9	126
20	10	235
20	11	639
20	12	698
20	13	1919
20	14	450



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20	15	582
20	16	381
20	17	23
20	18	102
20	19	260
20	20	172
20	21	725
20	22	146
20	23	189
20	24	94
20	25	211
20	26	337

Origin	Destination	No. of Trips
21	1	259



21	2	96
21	3	362
21	4	286
21	5	209
21	6	1307
21	7	969
21	8	154
21	9	147
21	10	276
21	11	750
21	12	819
21	13	2251
21	14	528
21	15	683
21	16	447



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21	17	27
21	18	120
21	19	305
21	20	202
21	21	850
21	22	172
21	23	221
21	24	111
21	25	248
21	26	396

Origin	Destination	No. of Trips
22	1	171
22	2	63
22	3	239



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22	4	189
22	5	138
22	6	865
22	7	641
22	8	102
22	9	97
22	10	183
22	11	496
22	12	541
22	13	1489
22	14	349
22	15	452
22	16	296
22	17	18
22	18	79



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22	19	202
22	20	134
22	21	562
22	22	113
22	23	146
22	24	73
22	25	164
22	26	262

Origin	Destination	No. of Trips
23	1	138
23	2	51
23	3	193
23	4	153
23	5	111



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23	6	698
23	7	518
23	8	82
23	9	79
23	10	147
23	11	400
23	12	437
23	13	1203
23	14	282
23	15	365
23	16	239
23	17	14
23	18	64
23	19	163
23	20	108



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23	21	454
23	22	92
23	23	118
23	24	59
23	25	132
23	26	211

Origin	Destination	No. of Trips
24	1	86
24	2	31
24	3	120
24	4	95
24	5	69
24	6	434
24	7	322



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24	8	51
24	9	49
24	10	91
24	11	249
24	12	272
24	13	748
24	14	175
24	15	227
24	16	148
24	17	9
24	18	39
24	19	101
24	20	67
24	21	282
24	22	57



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24	23	73
24	24	36
24	25	82
24	26	131

Origin	Destination	No. of Trips
25	1	367
25	2	136
25	3	512
25	4	405
25	5	295
25	6	1849
25	7	1371
25	8	218
25	9	209



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25	10	391
25	11	1060
25	12	1158
25	13	3185
25	14	747
25	15	966
25	16	633
25	17	38
25	18	169
25	19	432
25	20	286
25	21	1203
25	22	243
25	23	313
25	24	156



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25	25	351
25	26	559

Origin	Destination	No. of Trips
26	1	76
26	2	28
26	3	106
26	4	84
26	5	61
26	6	383
26	7	284
26	8	45
26	9	43
26	10	81
26	11	219



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26	12	240
26	13	660
26	14	154
26	15	200
26	16	131
26	17	8
26	18	35
26	19	89
26	20	59
26	21	249
26	22	50
26	23	65
26	24	32
26	25	72
26	26	116



Minimum Residual = 70241798.006241

Optimal Beta = 0.001

Target Oi	Modelled Oi	Target Dj	Modelled Dj
5528	5528	5582	5583.0924172935
8112	8112	2066	2066.500588047
21826	21826	7781	7781.1608917154
9339	9339	6160	6160.1152100107
12153	12153	4492	4492.8265108158
12186	12186	28105	28103.470610726
13641	13641	20838	20835.265237322
15803	15803	3326	3326.2543216164
17636	17636	3178	3177.9832316611
15354	15354	5948	5947.8014868972
17230	17230	16126	16124.382488048
5829	5829	17606	17604.493628131



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5359	5359	48409	48408.751833741
6221	6221	11358	11357.24149476
9982	9982	14687	14686.006996429
9142	9142	9622	9621.6809231933
3569	3569	590	590.13998745672
5193	5193	2581	2581.1729091613
6174	6174	6572	6572.5861528901
10405	10405	4361	4361.2549732189
12209	12209	18286	18287.420032327
8076	8076	3702	3702.4066939934
6524	6524	4771	4771.4370307086
4057	4057	2386	2386.5499316526
17265	17265	5343	5344.3780933178
3578	3578	8515	8516.6263248659



Beta	Residual SSE
0.001	70241798.006241
0.002	70241798.006241
0.003	70241798.006241
0.004	70241798.006241
0.005	70241798.006241
0.006	70241798.006241
0.007	70241798.006241
0.008	70241798.006241
0.009	70241798.006241
0.01	70241798.006241
0.011	70241798.006241
0.012	70241798.006241
0.013	70241798.006241
0.014	70241798.006241



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0.015	70241798.006241
0.016	70241798.006241
0.017	70241798.006241
0.018	70241798.006241
0.019	70241798.006241
0.02	70241798.006241
0.021	70241798.006241
0.022	70241798.006241
0.023	70241798.006241
0.024	70241798.006241
0.025	70241798.006241
0.026	70241798.006241
0.027	70241798.006241
0.028	70241798.006241
0.029	70241798.006241



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0.03	70241798.006241
0.031	70241798.006241
0.032	70241798.006241
0.033	70241798.006241
0.034	70241798.006241
0.035	70241798.006241
0.036	70241798.006241
0.037	70241798.006241
0.038	70241798.006241
0.039	70241798.006241
0.04	70241798.006241
0.041	70241798.006241
0.042	70241798.006241
0.043	70241798.006241
0.044	70241798.006241



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0.045	70241798.006241
0.046	70241798.006241
0.047	70241798.006241
0.048	70241798.006241
0.049	70241798.006241
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0.068	70241798.006241
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0.07	70241798.006241
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0.12	70241798.006241
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0.135	70241798.006241
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0.24	70241798.006241
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0.4	70241798.006241
0.401	70241798.006241
0.402	70241798.006241
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0.407	70241798.006241
0.408	70241798.006241
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0.42	70241798.006241
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0.732	70241798.006241
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0.912	70241798.006241
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