### Index

<table>
<thead>
<tr>
<th>Term</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>acceleration factor</td>
<td>358, 361</td>
</tr>
<tr>
<td>access time</td>
<td>136–7</td>
</tr>
<tr>
<td>accessibility</td>
<td>3</td>
</tr>
<tr>
<td>activity</td>
<td>79</td>
</tr>
<tr>
<td>Activity-Travel Framework (ATF)</td>
<td>10</td>
</tr>
<tr>
<td>actual travel time</td>
<td>337</td>
</tr>
<tr>
<td>actuated signal control</td>
<td>83, 110</td>
</tr>
<tr>
<td>additive random utility maximizing (ARUM) approach</td>
<td>71, 75</td>
</tr>
<tr>
<td>ADVANCE</td>
<td>179, 181, 208</td>
</tr>
<tr>
<td>advanced traffic management systems (ATMS)</td>
<td>84</td>
</tr>
<tr>
<td>advanced traveler information systems (ATIS)</td>
<td>84, 177, 179, 232–49, 262, 265, 275</td>
</tr>
<tr>
<td>advanced traveler management systems (ATMS)</td>
<td>177</td>
</tr>
<tr>
<td>AIMSUN</td>
<td>263, 268–9</td>
</tr>
<tr>
<td>Akcelik function</td>
<td>92–3</td>
</tr>
<tr>
<td>all-or-nothing assignment</td>
<td>264</td>
</tr>
<tr>
<td>augmented Lagrangian method</td>
<td>322</td>
</tr>
<tr>
<td>Average Trade Coefficient</td>
<td>375</td>
</tr>
<tr>
<td>backpropagation</td>
<td>179, 182, 189–94, 196–8, 201, 207</td>
</tr>
<tr>
<td>through time (BPTT)</td>
<td>179, 190, 196, 200–201, 207</td>
</tr>
<tr>
<td>behavioral</td>
<td></td>
</tr>
<tr>
<td>mechanism</td>
<td>11, 18–9</td>
</tr>
<tr>
<td>predisposition</td>
<td>9</td>
</tr>
<tr>
<td>Bellman-Ford-Moore</td>
<td>286</td>
</tr>
<tr>
<td>Belo Horizonte metropolitan</td>
<td>377</td>
</tr>
<tr>
<td>bi-level model (bilevel model)</td>
<td>339, 356–8, 361</td>
</tr>
<tr>
<td>bi-level programming (bilevel programming)</td>
<td>136, 143, 157, 234, 239–40, 248</td>
</tr>
<tr>
<td>bi-modal transportation network</td>
<td>134–6, 145, 153</td>
</tr>
<tr>
<td>binary logit model</td>
<td>37</td>
</tr>
<tr>
<td>block Gauss-Seidel decomposition approach</td>
<td>26</td>
</tr>
<tr>
<td>BPR (Bureau of Public Roads)</td>
<td>39, 51, 95, 145, 242, 261, 264, 267, 274–5, 283</td>
</tr>
<tr>
<td>break-even condition</td>
<td>149</td>
</tr>
<tr>
<td>build-operate-transfer (BOT)</td>
<td>158</td>
</tr>
<tr>
<td>business-to-business (B2B)</td>
<td>289–90</td>
</tr>
<tr>
<td>bypass route</td>
<td>349–50</td>
</tr>
<tr>
<td>capacity</td>
<td></td>
</tr>
<tr>
<td>expansion</td>
<td>16</td>
</tr>
<tr>
<td>rate</td>
<td>215–7, 220</td>
</tr>
<tr>
<td>reallocation</td>
<td>15–7</td>
</tr>
<tr>
<td>reduction</td>
<td>16</td>
</tr>
<tr>
<td>capital product</td>
<td>382</td>
</tr>
<tr>
<td>car</td>
<td></td>
</tr>
<tr>
<td>occupancy</td>
<td>19</td>
</tr>
<tr>
<td>ownership</td>
<td>11, 19, 70</td>
</tr>
<tr>
<td>cascade correlation</td>
<td>179, 190, 198–201, 206–7</td>
</tr>
<tr>
<td>category analysis</td>
<td>2</td>
</tr>
<tr>
<td>C-economy</td>
<td>380–81, 388</td>
</tr>
<tr>
<td>central business district (CBD)</td>
<td>384</td>
</tr>
<tr>
<td>Chicago Area Transportation Study (CATS)</td>
<td>56, 58</td>
</tr>
<tr>
<td>Chicago Sketch Network</td>
<td>50</td>
</tr>
<tr>
<td>coastal navigation</td>
<td>365</td>
</tr>
<tr>
<td>Cobb-Douglas assumption</td>
<td>381</td>
</tr>
<tr>
<td>cognitive capacity</td>
<td>380</td>
</tr>
<tr>
<td>combined</td>
<td></td>
</tr>
<tr>
<td>models</td>
<td>25, 37, 39–40</td>
</tr>
<tr>
<td>transport and land-use model</td>
<td>113–14</td>
</tr>
<tr>
<td>commercial property</td>
<td>383–84</td>
</tr>
<tr>
<td>complementary slackness theorem</td>
<td>75</td>
</tr>
<tr>
<td>congestion</td>
<td></td>
</tr>
<tr>
<td>charge</td>
<td>154</td>
</tr>
<tr>
<td>cost</td>
<td>135</td>
</tr>
<tr>
<td>level</td>
<td>218</td>
</tr>
<tr>
<td>pricing</td>
<td>113–6, 119–20, 125–32, 135, 143</td>
</tr>
<tr>
<td>toll</td>
<td>135, 139, 143–4, 147, 153</td>
</tr>
<tr>
<td>consumer</td>
<td></td>
</tr>
<tr>
<td>surplus (CS)</td>
<td>139, 158, 162, 164–6, 168–73</td>
</tr>
<tr>
<td>theory</td>
<td>19</td>
</tr>
<tr>
<td>welfare</td>
<td>9</td>
</tr>
<tr>
<td>continuous network design problem (CNDP)</td>
<td>158–59, 161–4, 163, 166–72</td>
</tr>
<tr>
<td>CONTRAM</td>
<td>5</td>
</tr>
<tr>
<td>convex</td>
<td></td>
</tr>
<tr>
<td>combination</td>
<td>314</td>
</tr>
<tr>
<td>optimization problem</td>
<td>26, 33, 138</td>
</tr>
<tr>
<td>cordon pricing</td>
<td>6</td>
</tr>
<tr>
<td>corridor</td>
<td>374</td>
</tr>
<tr>
<td>Term</td>
<td>Page Numbers</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>corridor-to-corridor flow</td>
<td>375</td>
</tr>
<tr>
<td>CORSIM</td>
<td>263</td>
</tr>
<tr>
<td>cost minimizing behavior</td>
<td>70–81</td>
</tr>
<tr>
<td>counterpropagation</td>
<td>179, 189–90, 193–5, 201, 207</td>
</tr>
<tr>
<td>Cournot-Nash game</td>
<td>86</td>
</tr>
<tr>
<td>creative capacity</td>
<td>380</td>
</tr>
<tr>
<td>C-region</td>
<td>384–5, 388</td>
</tr>
<tr>
<td>C-resource</td>
<td>380</td>
</tr>
<tr>
<td>critical segments</td>
<td>366</td>
</tr>
<tr>
<td>cross</td>
<td>3, 11, 15</td>
</tr>
<tr>
<td>-elasticity</td>
<td>183, 185–9, 196, 206</td>
</tr>
<tr>
<td>-occupancy</td>
<td>183–4, 186</td>
</tr>
<tr>
<td>Croydon</td>
<td>6</td>
</tr>
<tr>
<td>cycle length</td>
<td>84, 91–2</td>
</tr>
<tr>
<td>Davidson function</td>
<td>267</td>
</tr>
<tr>
<td>decision pattern</td>
<td>73–4, 77</td>
</tr>
<tr>
<td>demand</td>
<td>366</td>
</tr>
<tr>
<td>elasticity</td>
<td>16, 17, 154</td>
</tr>
<tr>
<td>function</td>
<td>5, 12, 19, 307, 309</td>
</tr>
<tr>
<td>management</td>
<td>1, 4, 6, 10</td>
</tr>
<tr>
<td>–response</td>
<td>154</td>
</tr>
<tr>
<td>Dennis Package</td>
<td>115</td>
</tr>
<tr>
<td>departure time</td>
<td>154</td>
</tr>
<tr>
<td>destination-based travel time</td>
<td>316</td>
</tr>
<tr>
<td>deterministic user equilibrium</td>
<td>88, 104, 157, 170, 172</td>
</tr>
<tr>
<td>DIADEM</td>
<td>20</td>
</tr>
<tr>
<td>Dijkstra algorithm</td>
<td>286</td>
</tr>
<tr>
<td>direct utility function</td>
<td>139, 149</td>
</tr>
<tr>
<td>disaggregate</td>
<td></td>
</tr>
<tr>
<td>model</td>
<td>19</td>
</tr>
<tr>
<td>simplicial decomposition (DSD)</td>
<td>341, 358, 361</td>
</tr>
<tr>
<td>discrete</td>
<td>4, 5, 7–9</td>
</tr>
<tr>
<td>choice</td>
<td></td>
</tr>
<tr>
<td>see also discrete choice model</td>
<td>70, 71–2, 75–7, 78, 80</td>
</tr>
<tr>
<td>network design problem (DNDP)</td>
<td>158</td>
</tr>
<tr>
<td>dispersion parameter</td>
<td>90, 97–8</td>
</tr>
<tr>
<td>distance-related cost</td>
<td>282, 284</td>
</tr>
<tr>
<td>distributor</td>
<td>289–304, 306–9, 310–11</td>
</tr>
<tr>
<td>Dortmund</td>
<td>58, 61, 66</td>
</tr>
<tr>
<td>double-stage algorithm</td>
<td>314</td>
</tr>
<tr>
<td>doubly</td>
<td></td>
</tr>
<tr>
<td>constrained model</td>
<td>314</td>
</tr>
<tr>
<td>constrained origin-destination</td>
<td></td>
</tr>
<tr>
<td>departure time/route choice (DUE-DC-OD-D-R)</td>
<td>315–18, 326, 328–9</td>
</tr>
<tr>
<td>Downs-Thomson effect</td>
<td>18</td>
</tr>
<tr>
<td>paradox</td>
<td>15</td>
</tr>
<tr>
<td>driver</td>
<td></td>
</tr>
<tr>
<td>information</td>
<td>83, 84, 89, 104, 109</td>
</tr>
<tr>
<td>reactivity</td>
<td>97–8, 100, 104–7, 109–110</td>
</tr>
<tr>
<td>response</td>
<td>93, 105</td>
</tr>
<tr>
<td>dual multiplier</td>
<td>350</td>
</tr>
<tr>
<td>dual-based algorithm</td>
<td>320</td>
</tr>
<tr>
<td>duality theory</td>
<td>74</td>
</tr>
<tr>
<td>dummy time-independent super-origin</td>
<td>319</td>
</tr>
<tr>
<td>dynamic</td>
<td></td>
</tr>
<tr>
<td>dynamic traffic assignment (DTA)</td>
<td>162, 262</td>
</tr>
<tr>
<td>see also dynamic travel choice model</td>
<td>326</td>
</tr>
<tr>
<td>user equilibrium</td>
<td>157, 172, 262, 327–8</td>
</tr>
<tr>
<td>variable message signs</td>
<td>262</td>
</tr>
<tr>
<td>economic</td>
<td></td>
</tr>
<tr>
<td>equilibrium condition</td>
<td>297</td>
</tr>
<tr>
<td>impacts</td>
<td>366–7</td>
</tr>
<tr>
<td>sector</td>
<td>374</td>
</tr>
<tr>
<td>educated labor</td>
<td>381, 384–5</td>
</tr>
<tr>
<td>educational</td>
<td></td>
</tr>
<tr>
<td>capital</td>
<td>385</td>
</tr>
<tr>
<td>density</td>
<td>384</td>
</tr>
<tr>
<td>egress time</td>
<td>136–7</td>
</tr>
<tr>
<td>elastic demand</td>
<td>5, 15–6, 341</td>
</tr>
<tr>
<td>electronic</td>
<td></td>
</tr>
<tr>
<td>commerce (e-commerce)</td>
<td>289–90, 311</td>
</tr>
<tr>
<td>road pricing</td>
<td>134</td>
</tr>
<tr>
<td>energy consumption</td>
<td>14</td>
</tr>
<tr>
<td>entropy maximization</td>
<td>8</td>
</tr>
<tr>
<td>see also entropy-constrained methods</td>
<td>25</td>
</tr>
<tr>
<td>entry rate</td>
<td>215, 220</td>
</tr>
<tr>
<td>equilibrium</td>
<td>374</td>
</tr>
<tr>
<td>assignment</td>
<td>5, 346</td>
</tr>
<tr>
<td>conditions</td>
<td>297, 311, 324, 326–7, 340, 382</td>
</tr>
<tr>
<td>decomposed optimization algorithm</td>
<td>240</td>
</tr>
<tr>
<td>flow</td>
<td>340, 343</td>
</tr>
<tr>
<td>link flow solution</td>
<td>341, 352, 355, 357</td>
</tr>
<tr>
<td>model</td>
<td>1, 14, 18, 20</td>
</tr>
<tr>
<td>network design (END)</td>
<td>86, 89</td>
</tr>
<tr>
<td>rent structure</td>
<td>387</td>
</tr>
<tr>
<td>solution</td>
<td>340, 346–7, 350, 353, 355–6, 382</td>
</tr>
<tr>
<td>traffic signal setting (ETSS)</td>
<td>83–7, 89, 91–3, 97, 99, 105–110</td>
</tr>
<tr>
<td>equisaturation control policy</td>
<td>91–2, 94, 99, 101–104, 106–109</td>
</tr>
<tr>
<td>Evans-like algorithm</td>
<td>48–9, 50, 52, 55–6</td>
</tr>
<tr>
<td>Evans-mRAS</td>
<td>324–6</td>
</tr>
<tr>
<td>excess cost (travel time)</td>
<td>47, 270</td>
</tr>
<tr>
<td>exit rate</td>
<td>215, 217</td>
</tr>
<tr>
<td>extreme value distribution</td>
<td>71–2, 81</td>
</tr>
<tr>
<td>feasibility check problem</td>
<td>346–8, 355</td>
</tr>
<tr>
<td>Federal Highway Administration (FHWA)</td>
<td>283, 289</td>
</tr>
</tbody>
</table>
Index

fee level 128–30
FIFO 210, 228, 230
financial disaster 365
first start solution 359–61
first-best pricing 139, 141–2, 145
five-stage model/approach 3, 6, 7
Fixed Matrix (FM) 11–12, 17, 19, 20
fixed-point model 266
flow
  constraint 358, 361, 363
  goal 348, 356, 358, 361, 363
  -carrying link 331
  -to-capacity ratio 93
forward star 285–6
four-stage model/approach 2–3, 7–8, 11, 13–14, 19–20
four-step transportation planning model 25, 36–7
Frank-Wolfe (FW) algorithm (method) 26, 59, 267, 314, 319, 330–31
  linearization 59
free trade agreements 365–66
free-flow travel time (FFTT) 96, 146, 255–56, 264, 283, 322
frequency elasticity 11
game theory (game-theoretic approach) 86
Gaussian function 254
general
  equilibrium 382
  extreme value (GEV) 9
  household consumption 19
generalized
  cost (travel time) 12, 28, 33, 35, 38–9, 70, 72–4, 76, 119, 121, 337, 339–40, 355
  elasticity 13, 20
  extreme value (GEV) distribution 75
  link travel time 339
  reduced gradient (GRG) 159, 164, 167, 170, 172
  genetic algorithm 339, 358
geographic information systems (GIS) 6, 278, 287
global positioning system (GPS) 110, 278
goal constraints 341, 349
goal-constrained traffic equilibrium problem 340–41
gradient law 387
gradient projection (GP) method 319, 321
gravity model 29, 59, 72, 76–8, 80, 315
  gravity-type distribution 28, 33, 40
  green (time) split 84, 86, 91–2, 94, 97–101, 104, 109–110
Gumbel distribution 81
  see also probability distribution 137
handling cost 29, 307, 309
Heavy Vehicle Participation 375
hedonic price function 384
Hessian 167
high-occupancy vehicle 135
Highway Capacity Manual (HCM) 283
highway
  network 367
  segment 367
  traffic volumes 376
  transportation network 365
Hook and Jeeves 143, 240, 338, 356, 358, 361, 363
ILUMASS 61
incremental logit 19
  see also nested logit 6, 19
independence of irrelevant alternatives (IIA) 234
indirect utility function 154
individual link travel time adjustment 351
induced
  demand 15
  traffic 1, 11–6, 20
information
  flow 380
  theory 59
initial solution 363
inland waterway 365
intelligent transportation systems (ITS) 177–8, 278, 290
inter-modal transport 135
internal flows 377
infraregional pricing 387
intra-trip 315, 326, 331, 335
in-vehicle route guidance 262
in-vehicle time 137
inverse nonlinear multicommodity network flow problem 341
ISGLUTI 4
iterative optimization and assignment (IOA) 85–9, 93–5, 97–103, 105–109
Jacobian matrix, 301
joint entropy distribution/assignment model (JEDA) 314–15, 319, 326
Kalman filtering theory 252
Karush-Kuhn-Tucker (KKT) constraints 32, 140, 329
see also Kuhn–Tucker conditions
kernel regression model 253–4, 258
knowledge
capital 381–2, 388
density 381
expansion model 383
- oriented C-economy 388
- oriented economy 388
- oriented regional economy 383
Lagrange multiplier 140, 294, 320–22, 326–7, 340
Lagrangian 31, 320, 329
Lanark 5
land use, transportation and environment
(LTE) 67
land-use 1, 3–4, 7, 13, 19
pattern 158, 162, 172, 388
structure 113
- transport model 3–4, 7
lane changing 261, 269
least-cost routes 279
leftmost flow constraint 363
level of
congestion 369
service 1–2, 43, 134, 136, 367
LGORU (Local Government Operational Research Unit) 4
light rail transit (LRT) 6, 15
Lighthill-Whitham-Richards theory 210
linear
constraints 342, 350
flow constraints 349
optimization problem 340
link
capacity 146
delay function 85
flow 335, 337–8, 340, 342, 346, 348–9, 351, 357
capacity 342, 346, 357
solution 347, 355–6
capacity 342, 346, 357
solution 347, 355–6
travel time 341, 345, 347, 358
adjustment 357
weight 345, 351, 353, 355
width 349, 351–2
link-based algorithm 315, 319, 326, 330
link-junction-based network model 7
Linköping network 338, 342, 348–50, 352, 361, 363
link-route incidence 90
Lipschitz continuous 305–306
local
constant model 253
linear model 253, 255–6, 258
regression 253–4, 258
minimum 357–8
location
criteria 381
pattern 116, 121, 125, 130–31, 380
location-based mobile services (LBMS) 278–79
see also location-based services (LBS)
logit
formula 136–7
model 71, 75, 77, 90, 97, 139
logit-based
modal split 141
SUE 86, 90, 93, 99, 234
logit-type share model 15
loop detector 177, 181–3, 189–90
Lowry model 3, 9
Lowry-type mechanism 4
LTE 67
LUTR cluster 114, 132
macroeconometric model 367
macro-region 374
macroscopic traffic theory 184, 210
Malmö 385
marginal cost 280, 292–3, 296–7, 300
see also external cost 139; social cost 143–4, 149
marginal-cost pricing 141–2, 146, 148–53
market equilibrium conditions 297
Markowitz's model 386
maximal exhaust fume emission 337
mean squared error (MSE) 193
MERCOSUL 365
microeconometric
approach 7, 10
model 3–4, 6
microsimulation 5–7, 61, 63
module 61, 63
mid-value theorem 305
minimal
adjustment 347
perceived travel time adjustment 355
unconstrained travel time adjustment 354
minimum-cost flow problem 330
mixed network design problem (MNDP) 158
mobile position determination system 278
modal choice 2, 4
modal split 2, 8, 15, 25–7, 29, 37, 39–40, 134–6, 139, 142–5, 149, 153–4, 341
mode choice 43, 113, 118, 138, 141, 147
see also split 137, 151
model flow capacity 338
modified link travel time 346
projection method 307–311
Mohring effect 154
monetary
outlay 337
cost 117, 120
Monte Carlo simulation 248
movement
occupancy 216–8, 220
queue 216
mRAS 335
multi-class problems 26, 37, 40
multicollinearity 187, 207
multi-modal equilibrium 15
multinational Corporations (MNCs) 384
multinomial logit model 9, 71–2, 77
multi-objective optimization 158
multiple-equilibrium behavior 87
nested
diagonalization (ND) 315, 317–18, 334
diagonalization-augmented Lagrangian-GP (ND-AGP) 320
logit models 4, 7–9, 17, 19, 118
network
assignment (loading) 260, 265, 267, 269, 342
design problem (NDP) 157–8, 172, 240
equilibrium model 26, 28, 240
topology 158
neural
network model 252–3
networks 177–82, 189–207
Newton–Raphson method 164
none-home-based 38
non-FIFO 211, 214–5, 228, 230
nonlinear (non-linear)
eigen-value equation 382
non-convex problem 339
optimization 120
nonparametric method 252–3
occupancy 183–4, 186–91, 206
O–D
cost 45–6, 48–9
demand 317, 322, 324, 330, 333, 335
flow 44–9, 50, 52, 56, 314, 330, 332
generalized cost 51
matrix 153, 240
route travel time 316, 333
trip demand 318, 334–5
OECD 380–81
operational
capacities 366–7
costs 366
optimal
dual solution 349
location 380
network performance 234, 239, 248
optimality conditions 293–4, 296–8
origin-based
algorithm 48–9, 50, 52, 55–6
travel time 316
origin-destination (O–D)
demand 235–36, 238, 243
flow 159
matrix 374
Pallottino graph growth algorithm 286
PARAMICS 5, 263
parking
fee 117–18, 121
information system (PIS) 232–33, 243
passenger car-equivalent units 283
path 317, 330
path-based algorithm 315, 319, 322, 326
penalty
method 320
parameter 320–22, 326, 357
perceived utility 70–71, 75–6, 81
Perron theorem 382
phase sequencing 83
planning horizon 158–59, 162–4, 166, 169–70, 172
platoon dispersion 177, 214
political stability 381
positioning technology 278
prediction horizon 258
predictive data mining 252
pricing regime 15, 18
primary goal 339
probabilistic
discrete choice 9
user equilibrium 157
probit-based
approach 235
SUE model 234, 241
production cost 291–2, 300–302, 307–308
PROSPECTS project 114, 132
public
transit 136
transport 3, 13, 15, 18, 114–15, 117–18, 122–8, 131–2, 134
transport assignment 5
quality of service 233
queuing delay 337
quick propagation 198
random
  utility 8–9
  function 136–7
  theory 59
RAS algorithm 315, 334–5
real-time traffic data 282–3, 286
recurrent cascade correlation (RCC) 179, 190, 200–201, 206–207
Reduction of Coefficient 375
relative mean error (RME) 256, 258
rental bid-price 387
reserve capacity 158
response mechanism 6, 10, 12–14, 17, 20
resulting traffic equilibrium problem 355
revealed preference (RP) 5–7
reverse star 285–6
right-hand-side link 342
ring road 113, 115–16, 119–32
road
  accessibility 384
  investment 115, 130
  pricing 10, 16, 113, 115–8, 120–28, 130–32, 134–5, 149, 153, 337
  segment 349–50, 355
  space allocation 13
  toll 134
dispersion 104, 107, 109
cost 45
flow 47, 91, 317, 338
guidance 84
information 233–7, 239–40, 242–9
proportion 49
selection 13
split 8
state 317
switching 1, 12, 17, 20
toll time 161, 170, 232–3, 235–8, 243, 245
SACTRA 1, 4, 12–7, 20
São Paulo 377
SAS 183–4, 188
saturation flow (SAT) 91, 96
SATURN 5, 16
scenario flow 342
second start solution 359–60, 362
secondary goal 339
second-best price 136, 142
SELNEC study 2
sensitivity analysis 13, 143, 240–41, 358
service trip 118
shopping trip 118, 125
shortest-route algorithm 66
short-term
  forecasting algorithm 252
  traffic planning 276
SIAS 5
side constraints 347, 350–51
side-constrained
  problem 320
  traffic equilibrium problem 342, 347, 349, 351, 353
signal control 177, 240
  setting 83–9, 91–4, 104, 109–110
  timing 83, 90, 222, 230
signalized intersection 90, 95, 97, 210, 215–16
simplex algorithm 330
simulated annealing 339
simulation 252, 262, 267, 269, 273
single-level optimization model 240
singly constrained model 314
Sioux Falls network 338, 342, 357–8
Slater condition 340
slow mode 117, 125, 127, 131
smartcard 134
social
  marginal cost 120, 134, 140–42
  optimum 136, 143
  welfare 16, 136, 140, 147, 149, 153
spatial economic network 300
spatiotemporal pattern 252–3, 255–6, 258
speed limit 337
stability analysis 300
Stackelberg game 86, 339
starting solution 358, 361
stated preference (SP) 4–7, 10
steady state 212, 214
step size 47–9, 50, 51–2, 55
stimulus-response relationship 8
stochastic
  network loading 107–108
  route choice 84, 104
  traffic equilibria 92
  user equilibrium (SUE) 25, 84, 88–90, 92, 94, 97, 99, 109, 157, 172, 234–5, 239–40
Stockholm 113, 115–16, 385, 387–8
stopping criterion 94
strategic
  planning 113
  traffic management 337
Stuttgart Neural Network Simulator 208
sum squared error (SSE) 193
supernetwork 289–90, 299, 308
Index

supply chain 289, 290, 296, 297–9, 306, 311
supply-demand equilibrium 233
sustainability 113
Swedish Agency for Innovation Systems 132
system optimization (system optimum) 139, 142, 144, 148–53
target flow equilibrium pricing problem 341, 345–8, 350–51, 353, 355
tentative travel time adjustment 338
time series model 252
time-dependent destination 319
O–D demand 315–16
origin 319
shortest path 315
travel time 324, 327
user equilibrium problem 319
trip arrival 317
trip departure 317
time-space
link 320
network 318, 321
time-variant prediction 252
toll charge (toll fee) 129–30, 138, 141
ring 115–16, 120–21, 127–31,
topmost flow constraint 350
total
marginal cost 120
social cost 149
travel time 85
trade coefficients 374–5
traffic
contour map 252
control system 178, 240
equilibrium 260
model (problem) 337, 341–2, 348, 358, 361
flow 177, 190, 207, 210, 217, 337, 349, 355, 363
induction 20
information 232, 238
loading 260, 265, 267
management 4–5, 134, 339, 356
mix 367
network 338–9
pattern 214
signal 214, 218, 222, 230, 240
simulation model 177
system 178
volume 115, 131, 366–7, 374
-responsive signal control 83–4, 97, 109–110
transaction cost 291–302, 308
transfer cost 365
TRANSIMS 5, 18, 60
transit
fare 134, 138–9, 141–3, 146–7, 149, 153
frequency 137, 154
subsidy 134, 142–4, 153
travel time 146
trans-modal transport pricing 135, 149
transponder 134
transport
demand 116
pattern 116, 118, 126
planning 1–3, 7, 10, 14, 19
pricing 134, 136, 142, 145, 153
Transport Research Board (TRB) 14
transportation
capacity 380
facilities 366
links 366
networks 380
system 380
travel
behavior 1, 10, 17, 19, 139
choice 232, 235, 238–9
cost 12, 19, 119, 235
demand 70, 84, 118–19, 134, 142, 146–7, 149, 153, 158, 160, 162, 166–70, 172, 238, 338, 340–42, 349
distance 115, 117–18, 126–30
forecasting 1–2, 5, 17, 43
mode 117, 136
pattern 43, 130
adjustment 340–41, 345–6, 350–52, 354–5, 357–8, 361–2
function 51, 341–2, 345, 347–8
perception 84
trip
attraction 314, 319, 321–2, 324, 327, 329–30, 333–4
dispersion (distribution) 3, 25–6, 37, 39–40, 43, 72, 76–80, 113, 157–58, 314
distribution and traffic assignment (TDTA) 314
trip end 2, 8
generation 2, 25, 37, 40, 43, 113
matrix 6, 11
production 314, 319, 324, 327, 329–30, 333, 335
rate 3, 90, 95–6
TRIPS 19
two-stage decision process 381
management procedure 337–8, 342, 347–8, 356, 358, 361, 363

urban economics model 114
simulation model 114, 116, 121, 132
urbanization economy 384

user equilibrium (user optimal, user-equilibrium, user-equilibrium route choice model) 16, 32, 37, 40, 43, 46, 59, 60, 65–6, 84–6, 88, 92, 119, 141, 157–60, 172, 233, 260, 262, 274, 319, 326

user-optimizing network production model 369
utility function 9
maximization 19, 70
theory 9

V/C 367
value of time (VoT) 2, 5, 120–21
variable trip matrix (VM) 12–13

variance inflation factor (VIF) 187
variance-covariance matrix 9
variational inequality (VI) 26, 44, 139, 290, 292, 294, 297–302, 304–6, 311, 315, 316–17, 326, 328–9

VISSIM 263
volume
-delay 261, 263, 264–5, 267, 269, 275
-to-capacity ratio 367

waiting time 137, 154
Wardrop 16, 59, 161, 260, 274
Wardrop principle (Wardrop’s condition) 45, 59, 84, 119
weighted adjustment 346
Weighted Average of Coefficient 375
weighted least square (WLS) 187
regression model 253

zero-elasticity method 11
zigzagging phenomenon 326
zonal-based regression 2