AUTHOR INDEX

Aczel, J. I.163
Afriat, S.N. I.412
Alexandrov, A.D. I.390
Allen, R.G.D. I.287; II.41, II.78
Anders, W. I.261
Arrow, K.J. I.38, I.238, I.288, I.416; II.3, II.18, II.19, II.41, II.53, II.74, II.81, II.262
Atkinson, S.E. II.227
Averch, H. I.319; II.xx

Bailey, E.E. II.217, II.236
Barna, T. II.261
Barten, A.P. I.413
Bartle, R.G. I.383, I.406
Barzel, Y. II.150, II.163, II.187
Baumol, W. II.217
Belinfante, A. I.viii; II.188, II.191, II.200, II.210, II.212, II.261
Bellman, R.E. I.415
Ben-Israel, A. I.445
Berge, C. II.21, II.39, II.50
Berlinguette, V.R. II.19
Berndt, E. I.245, I.246, I.268; II.41, II.42, II.56, II.60, II.206, II.233
Blackorby, C. II.19, II.57
Bridge, J.L. I.267
Brooks, J. II.162
Brown, M. II.81, II.250
Bruno, M. I.x, I.37, I.242, I.245; II.10, II.20, II.36, II.53, II.54
Burgess, D. I.248, I.266, I.268; II.250, II.262
Busemann, H. I.383, I.390

Cameron, B. II.262
Cass, D. I.138
Carter, A. I.242; II.270
Cavallo, D.F. I.261
Chenery, B.H. I.38, I.238; II.74, II.81
Chow, G.C. II.276

Christensen, L.R. I.viii, I.131, I.170, I.196, I.237, I.245, I.246, I.268, I.281, I.410; II.227, II.251, II.266
Cobb, C.W. I.230, I.238
Corden, W.M. II.19, II.41
Courant, R. I.118, I.142
Courville, L. II.215, II.237
Cowing, T.C. I.viii, I.x; II.xx, II.191

Danskin, J.M. II.23
David, P. II.4, II.8, II.10, II.19, II.143
Davis, E.G. II.217
Debreu, G. I.5; II.21
Denny, M. I.viii, I.100, I.185, I.245, I.246, I.268; II.3, II.4, II.11, II.20, II.57, II.59, II.63, II.250, II.254
Dent, W.T. I.412
Dhrymes, P.J. I.243, I.288, I.297; II.81, II.88, II.96, II.103, II.188, II.230
Diamond, P.A. II.129, II.181
Dillon, J.L. I.410
Domar, E. II.4, II.13
Douglas, P.C. I.230, I.238

Eisenpress, H. I.444
Enthoven, A.C. I.416
Epstein, L. II.18, II.25, II.26, II.27, II.28, II.31, II.33

Fan, K. I.383
Fenchel, W. I.5, I.12, I.95, I.383, I.385, I.387, I.389, I.390
<table>
<thead>
<tr>
<th>Author</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferguson, C.</td>
<td>II.81</td>
</tr>
<tr>
<td>Finsler, P.</td>
<td>I.415</td>
</tr>
<tr>
<td>Frenger, P.</td>
<td>I.viii, I.268; ii.288</td>
</tr>
<tr>
<td>Fuss, M.A.</td>
<td>I.viii, I.214, I.246, I.248, I.268, I.340, I.341, I.342; II.63, II.65, II.187, II.189, II.190, II.193, II.209, II.254</td>
</tr>
<tr>
<td>Galatin, M.</td>
<td>II.150, II.163, II.188, II.191, II.211</td>
</tr>
<tr>
<td>Gale, D.</td>
<td>I.70, I.391</td>
</tr>
<tr>
<td>Gantmacher, F.R.</td>
<td>I.431</td>
</tr>
<tr>
<td>Geary, R.C.</td>
<td>II.19</td>
</tr>
<tr>
<td>Geyskens, E.</td>
<td>I.413</td>
</tr>
<tr>
<td>Goldman, S.M.</td>
<td>I.128, I.245, I.302; II.19</td>
</tr>
<tr>
<td>Grilliches, Z.</td>
<td>I.239, I.267; II.4, II.11</td>
</tr>
<tr>
<td>Grunbaum, B.</td>
<td>I.383, I.385, I.386, I.387</td>
</tr>
<tr>
<td>Hadley, G.</td>
<td>I.118</td>
</tr>
<tr>
<td>Hald, J.</td>
<td>II.271</td>
</tr>
<tr>
<td>Hall, R.E.</td>
<td>I.viii, I.ix, I.170, I.185, I.248; II.3, II.153, II.251</td>
</tr>
<tr>
<td>Halter, A.N.</td>
<td>I.242</td>
</tr>
<tr>
<td>Harberger, A.</td>
<td>II.81</td>
</tr>
<tr>
<td>Heady, E.O.</td>
<td>I.410</td>
</tr>
<tr>
<td>Hicks, J.R.</td>
<td>I.viii, I.149, I.287; II.17, II.23, II.78, II.181</td>
</tr>
<tr>
<td>Hilbert, H.</td>
<td>I.142</td>
</tr>
<tr>
<td>Hildreth, C.</td>
<td>I.412</td>
</tr>
<tr>
<td>Hoch, I.</td>
<td>I.249, I.261</td>
</tr>
<tr>
<td>Hocking, J.G.</td>
<td>I.242</td>
</tr>
<tr>
<td>Holthausen, D.M.</td>
<td>II.217</td>
</tr>
<tr>
<td>Hotelling, H.</td>
<td>I.viii, I.5, I.14, I.145; II.30, II.223</td>
</tr>
<tr>
<td>Householder, A.S.</td>
<td>I.422, I.429</td>
</tr>
<tr>
<td>Hudson, D.J.</td>
<td>I.268, I.412</td>
</tr>
<tr>
<td>Intriligator, M.D.</td>
<td>I.377</td>
</tr>
<tr>
<td>Johnson, L.</td>
<td>I.319</td>
</tr>
<tr>
<td>Jokos, P.L.</td>
<td>II.217, II.235</td>
</tr>
<tr>
<td>Kakwani, N.C.</td>
<td>II.276</td>
</tr>
<tr>
<td>Karlin, S.</td>
<td>I.95, I.383, I.389, I.406</td>
</tr>
<tr>
<td>Katzner, D.W.</td>
<td>I.415</td>
</tr>
<tr>
<td>Kendall, M.G.</td>
<td>I.441, I.450</td>
</tr>
<tr>
<td>Kendrick, J.</td>
<td>II.81</td>
</tr>
<tr>
<td>Khang, C.</td>
<td>II.20, II.36</td>
</tr>
<tr>
<td>Klee, V.</td>
<td>I.70, I.383, I.386, I.391</td>
</tr>
<tr>
<td>Klein, L.R.</td>
<td>I.258, I.285, I.410; II.221</td>
</tr>
<tr>
<td>Klevorick, A.K.</td>
<td>II.217</td>
</tr>
<tr>
<td>Komiya, R.</td>
<td>II.212</td>
</tr>
<tr>
<td>Konyus, A.A.</td>
<td>II.29, II.30</td>
</tr>
<tr>
<td>Koopmans, T.C.</td>
<td>I.214</td>
</tr>
<tr>
<td>Kurz, M.</td>
<td>I.243, I.288, I.297; II.81, II.88, II.96, II.103, II.188, II.230</td>
</tr>
<tr>
<td>Leontief, W.W.</td>
<td>II.9, II.41, II.269</td>
</tr>
<tr>
<td>Liew, C.K.</td>
<td>I.lix</td>
</tr>
<tr>
<td>Ling, S.</td>
<td>II.197</td>
</tr>
<tr>
<td>Litzenberger, R.</td>
<td>II.242</td>
</tr>
<tr>
<td>Lucas, R.</td>
<td>II.81</td>
</tr>
<tr>
<td>Malinvaud, E.</td>
<td>II.202, II.204, II.276</td>
</tr>
<tr>
<td>Mangasarian, O.L.</td>
<td>I.383</td>
</tr>
<tr>
<td>Manne, A.S.</td>
<td>II.81</td>
</tr>
<tr>
<td>Marschak, J.</td>
<td>I.261</td>
</tr>
<tr>
<td>May, D.</td>
<td>I.245; II.59</td>
</tr>
<tr>
<td>McKenzie, L.</td>
<td>I.5, I.14, I.47; II.5</td>
</tr>
<tr>
<td>Author Name</td>
<td>Pages</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
</tr>
<tr>
<td>McKinnon, R.</td>
<td>II.81</td>
</tr>
<tr>
<td>Metcalf, L.</td>
<td>II.162</td>
</tr>
<tr>
<td>Myers, S.C.</td>
<td>II.217</td>
</tr>
<tr>
<td>Miller, R.G.</td>
<td>I.449</td>
</tr>
<tr>
<td>Minhas, B.</td>
<td>I.38, I.238, I.74, II.81</td>
</tr>
<tr>
<td>Mork, K.</td>
<td>I.94</td>
</tr>
<tr>
<td>Mukherji, V.</td>
<td>I.243, I.288, I.297</td>
</tr>
<tr>
<td>Murray, W.</td>
<td>I.444</td>
</tr>
<tr>
<td>Nerlove, M.</td>
<td>I.viii, I.5, I.192, I.197, I.267; II.xx, II.74, II.127, II.151, II.177, II.188</td>
</tr>
<tr>
<td>Newman, P.</td>
<td>II.25</td>
</tr>
<tr>
<td>Ohta, M.</td>
<td>I.ix; II.xx</td>
</tr>
<tr>
<td>Parks, R.W.</td>
<td>I.267; II.42</td>
</tr>
<tr>
<td>Peterson, H.C.</td>
<td>II.215, II.219, II.229, II.237</td>
</tr>
<tr>
<td>Phillips, C.F.</td>
<td>II.218</td>
</tr>
<tr>
<td>Pinto, C.</td>
<td>I.268</td>
</tr>
<tr>
<td>Pollak, R.A.</td>
<td>I.116, I.128; II.18, II.25</td>
</tr>
<tr>
<td>Popoviciu, T.</td>
<td>I.390</td>
</tr>
<tr>
<td>Raiffa, H.</td>
<td>II.201</td>
</tr>
<tr>
<td>Rao, C.R.</td>
<td>I.445</td>
</tr>
<tr>
<td>Razin, A.</td>
<td>I.242, I.246</td>
</tr>
<tr>
<td>Reidemeyer, K.</td>
<td>I.390</td>
</tr>
<tr>
<td>Revankar, N.</td>
<td>I.242</td>
</tr>
<tr>
<td>Ringstad, V.</td>
<td>I.239, I.267; II.4, II.11</td>
</tr>
<tr>
<td>Roberts, A.W.</td>
<td>I.135</td>
</tr>
<tr>
<td>Rosenlicht, M.</td>
<td>I.383</td>
</tr>
<tr>
<td>Rothenberg, T.J.</td>
<td>I.441, I.443, I.444</td>
</tr>
<tr>
<td>Rothschild, M.</td>
<td>I.412</td>
</tr>
<tr>
<td>Roy, R.</td>
<td>I.viii, I.5; II.29</td>
</tr>
<tr>
<td>Salvas-Bronsard, L.D.L.</td>
<td>I.421</td>
</tr>
<tr>
<td>Sato, K.</td>
<td>I.242, I.244</td>
</tr>
<tr>
<td>Sato, R.</td>
<td>II.81, II.125</td>
</tr>
<tr>
<td>Sargan, J.D.</td>
<td>I.239</td>
</tr>
<tr>
<td>Scheffe, H.</td>
<td>II.204</td>
</tr>
<tr>
<td>Seitz, W.D.</td>
<td>II.150, II.162, II.185</td>
</tr>
<tr>
<td>Sevaldsen, P.</td>
<td>II.270, II.271</td>
</tr>
<tr>
<td>Shapiro, P.</td>
<td>II.156</td>
</tr>
<tr>
<td>Sibley, D.S.</td>
<td>II.217</td>
</tr>
<tr>
<td>Sims, C.A.</td>
<td>II.4, II.10, II.19, II.41, II.55</td>
</tr>
<tr>
<td>Solow, R.M.</td>
<td>I.38, I.238; II.81, II.162, II.250</td>
</tr>
<tr>
<td>Spann, R.M.</td>
<td>II.215, II.229, II.237</td>
</tr>
<tr>
<td>Star, S.</td>
<td>II.60</td>
</tr>
<tr>
<td>Stigler, G.</td>
<td>I.313</td>
</tr>
<tr>
<td>Stiglitz, J.E.</td>
<td>II.18, II.33</td>
</tr>
<tr>
<td>Syrquin, M.</td>
<td>II.188</td>
</tr>
<tr>
<td>Takayama, A.</td>
<td>I.412</td>
</tr>
<tr>
<td>Tilanus, C.B.</td>
<td>II.271, II.284</td>
</tr>
<tr>
<td>Valentine, F.A.</td>
<td>I.383, I.412</td>
</tr>
<tr>
<td>Varberg, D.E.</td>
<td>I.135</td>
</tr>
<tr>
<td>Vulcanci, Z.</td>
<td>I.250</td>
</tr>
<tr>
<td>Walters, A.A.</td>
<td>I.267</td>
</tr>
<tr>
<td>Weddepoth, H.N.</td>
<td>II.25</td>
</tr>
<tr>
<td>Wellsitz, S.H.</td>
<td>II.217</td>
</tr>
<tr>
<td>Wiley, D.E.</td>
<td>I.421</td>
</tr>
<tr>
<td>Wilkinson, J.H.</td>
<td>I.422</td>
</tr>
<tr>
<td>Wilks, S.S.</td>
<td>II.231, II.261</td>
</tr>
<tr>
<td>Winter, S.</td>
<td>I.71, I.385, I.394</td>
</tr>
<tr>
<td>Wold, H.</td>
<td>II.17, II.23, II.30</td>
</tr>
<tr>
<td>Wood, D.O.</td>
<td>I.246, I.268; II.41, II.42, II.56, II.60</td>
</tr>
<tr>
<td>Woodland, A.D.</td>
<td>I.266; II.20</td>
</tr>
<tr>
<td>Yotopoulos, P.A.</td>
<td>I.207, I.267</td>
</tr>
<tr>
<td>Zangwill, W.I.</td>
<td>II.28</td>
</tr>
<tr>
<td>Zeilner, A.</td>
<td>II.61, II.204, II.205, II.231, II.261, II.276</td>
</tr>
</tbody>
</table>
SUBJECT INDEX

ACMS (CES) I.38, I.238; II.74
Activity analysis I.333
Addilog normalized profit function I.195
Adding-up condition I.232; II.255
Additive separability I.158
Affine hull I.384
Aggregate commodities II.17
Aggregated utility function II.22
Aggregation I.284, I.222
consistent II.289
of outputs II.251
Almost homogeneous functions I.163
Approximation (of production relations) I.232, I.236, II.28, II.56, II.253
Asymptotically irreversible I.271
Asymptotic cone I.63, I.384
Average cost I.313
ex ante and ex post I.313
Averch–Johnson Model II.217–22
Barrier hyperplane I.384
Bernstein polynomial I.236
Bias of technical change II.128, II.182–85
Bordered matrix I.368
Boundedly polyhedral I.391
Bounding hyperplane I.16
Bounds (implied by technical progress) II.139
Capacity (of plant) II.99
Capital augmentation II.140
Capital share II.128
Capital stock in manufacturing II.60
CDE cost function I.241, I.291, I.295
CES I.38, I.238, II.74
combined with Cobb–Douglas I.193
composition I.57
cost function I.38, I.299
multiple-output frontier I.307, I.308
non-homothetic I.298
production function I.38, I.192, I.238, I.299; II.74
structure II.82–88
Characteristic value I.366
Cholesky factorization I.413, I.421–37
Cholesky values I.429
Classical cost function II.76
Classical production functions II.75, II.127
Classical programming problem I.375
second-order conditions I.380
Clay-clay model II.190
Closed function I.67, I.385
Closed half-space I.384
Cobb–Douglas I.6, I.38
composition I.56
cost function I.38, I.300
production function I.38, I.190, I.238, I.253, I.300
restricted profit function I.93, I.190
variants I.242, I.301, I.309
Comparative statics I.46, I.147, I.231
Complements I.48
Composite good II.9
Composition I.49, I.95
composition operator I.247
convolution of input requirement sets I.51
examples I.100
intersection of input requirement sets I.50
of cost functions I.49
of restricted profit functions I.95
scaling I.50
sums of input requirement sets I.51
union of input requirement sets I.50
Concave function I.12, I.127
quasi-concave I.12
strictly quasi-concave I.30
strictly differentiably quasi-concave
Concave function—contd
  I.30
    strongly concave I.135
Cone I.384
  asymptotic I.63, I.384
  normal I.62, I.385, I.389
  pointed I.384, I.387, I.388
  polar I.385
  recession I.63, I.384
Conical function I.271
Conjugate dual I.390
Conjugate functions I.139
Constant marginal share (CMS) production function I.242
Constrained estimation I.412, I.413, I.437–43
  generalized linear function I.439
  maximum likelihood I.441–43
  method of squaring I.412
  non-linear least squares I.444–45
  quadratic function I.438
  translog function I.438
Continuity I.12
  of correspondences I.63, II.21
  of cost function I.12
  of functions I.12, II.20
  of restricted profit function I.68
Conventional production possibility set I.10
Convex function I.67, I.385
  constrained estimation (quasi-convex) I.440
  examples I.274
  Hessian matrices I.414–20
  properties of approximating function I.418–20
  quasi-convex I.12, I.414–20
  strictly differentiably quasi-convex I.89, I.403
  strictly quasi-convex I.89, I.403
Convex set I.8, I.384
  convex from below I.8
  convex hull I.384
  properties I.385–386
  strictly convex from below I.16
Correspondence I.63, I.391, II.21
  bounded (semibounded) range I.391
  continuous I.63, I.392
  convex-valued I.391
  lower hemiconvergent I.63, I.391
  lower semicontinuous II.21
  maximand I.393, I.399
  semibounded-valued I.397
  strongly continuous I.63, I.391
  upper hemiconvergent I.63, I.391
  upper semicontinuous II.21
Cost function I.10
  asymptotes I.46
  CDE I.241, I.291, I.295
  definition I.10
  duality I.19
  derivative property I.14
  ex ante and ex post II.189, II.190
  generalized Leontief I.340, II.271–73
  geometry I.39
  input-conventional I.20
  joint II.253
  "kinks" and "flats" I.44
  nested I.340
  non-jointness II.256
  non-homothetic II.64
  polar I.112
  properties I.13, I.228, II.75
  separable II.253
  Shephard's lemma I.14
  transcendental logarithmic II.56, II.243, II.253–55
  value-added II.37–40
Cost mapping I.21
Cost-polar transformation I.121
Cournot aggregation condition I.232
CRES (CRESH) production function I.240, I.243, I.291, I.294, I.295
Criteria for functional forms I.224
Demand functions I.14
  inverse II.29
  short-run II.29
Depreciation II.154
Derivative property I.389, I.272
  gradient I.74, I.389
  Hessian I.74, I.389
  of cost function I.14
  of restricted profit function I.74, I.272
  subdifferential I.74, I.394
Diminishing returns I.48
Direction of recession I.137
Directional shadow elasticity of substitution II.291–96
inconsistent II.296–300
Disposal I.66
of inputs I.66
of outputs I.66
Distance function I.24, I.113, I.226
duality I.28
input-conventional I.26
properties I.26
Distribution I.221
Divisia index II.12, II.162
Dominant own-price effect I.279
Double deflation II.7
Duality I.19, I.390, I.138
conjugate duality I.390
extensions for cost functions I.35
extensions for restricted profit functions I.85, I.90, I.151–69
for cost functions I.21, I.115
for distance functions I.28
for restricted profit functions I.82
for valued-added functions II.37
homogeneity and separability I.151–169
Legendre transformations I.143 fn
multiple output I.173–182
polar reciprocal duality I.401
Shephard–Uzawa theorem I.21, I.115
Efficiency I.30, I.70, I.222, I.313
Elasticity of demand I.290, II.209, II.264
Elasticity of substitution I.42, I.197, I.240, I.344, II.73, II.78, II.128
Allen (AES) I.239, I.290, II.80
between outputs I.292
direct (DES) I.129, I.240, II.80
directional II.291
inconsistent II.287
OOES I.240
properties II.82 fn
relation to production function II.131
relation to separability II.42
shadow (SES) I.130, I.240, II.80, II.273
TOES I.240, I.288, I.291
TTES I.240, I.288
Elasticity of transformation I.289, I.293
TOET I.289, I.293
Electricity system design I.335
Electric power industry II.150, II.157–62
Empirical production analysis I.267
Engle aggregation condition I.232
Energy (intermediate input) II.41
Error structure I.259
Estimation methods (for production parameters) I.261
Euler’s law I.11, I.152
Eventually decreasing returns I.48
Eventually increasing costs I.48
Ex ante envelope profit function I.329
Ex ante technology I.313, I.324, I.345
envelope I.325
in steam-electric generation II.172, II.193
of a regulated electric utility II.225–27
parameters II.190
Exponential production function I.195
Exposed functions I.402
Exposed points I.68, I.396
Exposed sets I.396
Ex post cost function II.190
Ex post technology I.313, I.324, I.345
in steam-electric generation II.164, II.191
variable I.325
Ex post total profit function I.328
Factor augmentation II.128
Factor augmenting technical change II.135
conditions for II.135–37
finite parameter II.143
implied bounds II.139
Factor price elasticities (ex ante) II.209
Factor price frontier I.37, I.116, II.288
Factor price requirement set I.37
Factor requirement function I.129
Factor substitution II.269
Final demand I.250
Firm effect I.253
Fixed proportions II.8, II.69
Flat (affine subspace) I.384
Flexibility (of technology) I.313, I.221
Forward price I.325
Free disposal I.8, I.66
Free disposal hull 1.8
Subject Index

Functions I.12
  almost homogeneous I.163
  closed I.385
  conical I.271
  concave I.12
  continuous I.12
  convex I.12, I.67, I.274, I.385
  differentiability I.389
  dom f I.271
  epi f I.271
  lower semicontinuous I.31, I.73
  proper I.137
  quasi-concave I.12, II.25
  quasi-convex I.12, I.403, I.413
  set-valued I.391
  strictly differentiability quasi-convex I.403
  strictly quasi-convex I.403
  strongly continuous I.35
  upper semicontinuous I.31
Future price I.325

Gauge function I.76, I.102, I.123, I.400
Generalized Cobb–Douglas production function I.238
Generalized concave production function I.238
Generalized Leontief production function I.238, I.271
Generalized linear production function I.410
General linear profit form I.272
Generally non-decreasing costs I.48
Generally non-increasing returns I.48
Gradient I.30, I.75, I.389
Gross output II.6, II.54, II.59
Gross substitutes property I.276, I.362, II.5
Growth equations II.129

Handy–Whitman Index II.161, II.212
Harrod neutral technical change I.202
Hemicontinuous I.63, I.391
Hessian I.30, I.75, I.149, I.150, I.389
Hicks aggregation II.23, II.69
Hicksian laws of production I.144–45
Hicks neutral technical change I.202, II.261
Homogeneous I.11, I.121, I.127, I.151–82
  almost I.163
  frontier I.305
  of degree k I.152
  test of homogeneity II.58
Homothetic I.58, I.120, I.128, I.153, I.222, II.77, II.66, II.67
  frontier I.305
  lack of in electric-power generation II.163, II.189
  multiple output case I.173, I.305
  partially I.167
  test of homotheticity II.58, II.61
  weakly II.65
Homothetic-polar I.121, I.128
Homothetic separability I.159
Hotelling’s lemma I.145, I.230, II.223–25
Hyperplane I.16, I.383
  barrier I.384
  bounding I.16, I.384
  separation property I.384, I.386
  supporting I.16, I.384

Identification (technical change) II.133, II.152, II.155–57
Implicit gauge mapping I.82
Implicit input requirement set I.20
Implicit production possibility set I.20
Implicit profit mapping I.82
Implicit technology mapping I.82
Increasing function I.31, I.85
Indirect Harrod neutral technical change I.204
Indirect Hicks neutral technical change I.204
Indirect utility function II.24
Indirect production function I.116, II.26
Input-bundle I.6
Input-classical I.47
Input-conventional I.10, I.20
Input-homothetic I.58
Input (intermediate) II.11
Input–output coefficients II.272
Input–output ratio II.60
Input–output separable I.58
Input–regular I.7
Input requirement sets I.7, I.225
Intertemporal variability I.321
Subject Index

Inverse gauge mapping I.82
Inverse Legendre transformation I.143
Joint production I.121

Lagged adjustment I.212
Lagrangian multipliers I.375
associated with rate-of-return constraint II.220–22
critical point I.376
Legendre transformation I.142
Leontief hypothesis II.282
Lim inf I.67, I.385
Linear homogeneous I.11, I.271, I.385, II.27
Linear-in-parameters technology I.230, I.237, I.346
Lipschitzian I.389
Load curve I.335
Load factor I.335
Locally strongly concave I.135
Local solution I.375
Lower hemicontinuous correspondence I.63, I.391
Lower semicontinuous function I.73
Maintained hypotheses for estimation I.253–59
Mappings I.82
duality mappings I.104–07
Marginal rate of transformation II.265
Matrices I.365
bounded matrix I.368
characteristic value I.366
Cholesky factorization of I.422–25, I.430–32
determinant I.366
Frobenious root I.282
positive definite subject to constraint I.368
positive semidefinite I.277, I.365, I.427
principal minor I.365
real symmetric I.433–35
relative definiteness I.278
Maximand correspondence I.393, I.399
Monopolistic profit function I.209, II.218 fn
Monotonicity I.31, I.135
Multiple output production functions I.171, I.291, I.292, I.302, II.251
Multi-product final demand technology II.250
Nominal value-added II.19
Non-decreasing I.31, I.85, I.114
Non-degenerate programming problem I.376
Non-increasing I.31, I.85
Neoclassical I.35
Nested cost functions I.340
Net output I.61
Netput I.61
Net supply correspondence I.71
Neutral scale effect II.90
Non-constant returns II.145, II.176
Non-joint production I.182, I.362, II.251, II.252
Non-systematic error I.253
Normal cone I.62, I.345
Normal inputs I.48
Normalized price I.134
Normalized profit function I.134
addlog I.195
d example I.190
functional forms I.184
multiple output I.171
properties I.139
quadratic II.226
reciprocal quadratic I.196
structure I.151
transcendental logarithmic I.196
Normal to hyperplane I.384
Objectives of production analysis I.220
Output bundle I.6
Own-price effect I.148
Paasche price aggregates II.289
Parsimonious flexible forms I.233
Plant design I.320, I.324
Pointed cone I.384, I.387–88
Polar cone I.385
Polar production function I.112, I.118, I.119
Polar reciprocal functions I.401
Subject Index

Polar reciprocal sets I.37, I.401
Polytope I.391
Positive definite subject to constraint I.368
Positively linear homogeneous I.11, I.67, I.114, I.385
Positive semidefinite matrix I.277, I.365
Price aggregate (inconsistent) II.296
Price expectations II.200, II.213
Price possibility set I.92, I.103
Prices
  forward I.325
  future I.325
  spot I.325
Principal minor I.365
Producible output set I.7
Production function I.6, I.25, I.134, I.226
  almost homogeneous I.163
  CES (AMCS) I.38, I.238, I.299
  classical II.127
  Cobb–Douglas I.38, I.238
  constant marginal share (CMS) I.242
  CRES I.243, I.291, I.294, I.295
  CRESH I.240, I.296
  direct addilog I.298
  exponential I.195
  generalized Cobb–Douglas I.238
  generalized concave I.238
  generalized Leontief I.131, I.238
  generalized linear I.131
  indirect I.116, I.297, II.26
  Leontief I.299
  linear I.299
  multiple output I.170, II.251
  polar I.112, I.118, I.119
  properties I.135, I.136
  quadratic I.131, I.194, I.238
  reciprocal indirect I.295
  strictly neoclassical II.127
  variable ES (VES) I.242
Production plan I.61
  ex post I.324
Production possibility set I.6, I.61, I.113, I.225
  asymptotically irreversible I.271
  conventional I.10
  irreversible I.62
  properties I.61–66, I.102
  regular I.7, I.122, I.126
  semi-bounded I.62
  strongly continuous I.63
Production technology I.5
Profit function I.61, I.122, I.229 (see also
  normalized profit, restricted profit)
  composition rules for I.95
  design-linear profit structure I.346
  examples I.100
  for a regulated firm II.222–28, II.245–46
  future I.357
  general linear I.272
  Hotelling’s lemma II.230, II.223–25
  normalized I.134
  polar I.112
  polar variables I.129
  restricted profit function I.61
  saddle-functions I.101
  unit-output-price II.220, II.222
  variable I.129, II.20, II.30 fn
Profit polar frontier I.304
Profit polar production set I.126
Proper function I.137
Public goods II.18, II.32
Putty-clay technology I.315
  estimation in steam-electric generation II.208
  hypothesis I.362
  test of in steam electric generation II.204–08
Putty-putty technology I.315, II.188

Quadratic production function I.194, I.238
Quadratic profit function II.226
Quasi-concave I.12, II.33, II.76
Quasi-convex I.12, II.24
  estimation subject to I.437–43
  hypothesis testing of I.447–52

Rate of return regulation II.217–22
  test of in steam electric generation II.231–34
Rate of technical change II.128, II.168, II.177, II.180
Real value-added function II.35, II.69
  non-homothetic II.64
Recession cone I.63, I.384
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocal quadratic normalized profit function</td>
<td>I.196</td>
</tr>
<tr>
<td>Regressive inputs</td>
<td>I.48</td>
</tr>
<tr>
<td>Regular growth paths</td>
<td>II.131</td>
</tr>
<tr>
<td>Relative definiteness</td>
<td>I.278</td>
</tr>
<tr>
<td>Relative efficiency</td>
<td>I.206</td>
</tr>
<tr>
<td>Relative interior</td>
<td>I.76, I.384</td>
</tr>
<tr>
<td>Restricted cost function</td>
<td>II.192</td>
</tr>
<tr>
<td>Restricted profit function</td>
<td>I.61</td>
</tr>
<tr>
<td>composition rules</td>
<td>I.95</td>
</tr>
<tr>
<td>continuity</td>
<td>I.68, I.70</td>
</tr>
<tr>
<td>definition</td>
<td>I.66</td>
</tr>
<tr>
<td>examples</td>
<td>I.93, II.3</td>
</tr>
<tr>
<td>joint continuity</td>
<td>I.72</td>
</tr>
<tr>
<td>kinks and flats</td>
<td>I.90, I.91</td>
</tr>
<tr>
<td>nested</td>
<td>I.101</td>
</tr>
<tr>
<td>properties</td>
<td>I.67, I.68, I.103</td>
</tr>
<tr>
<td>Returns to scale</td>
<td>I.48, I.221, II.156</td>
</tr>
<tr>
<td>in steam-electric generation</td>
<td>II.176, II.177, II.195</td>
</tr>
<tr>
<td>Revenue function</td>
<td>I.302</td>
</tr>
<tr>
<td>polar</td>
<td>I.303</td>
</tr>
<tr>
<td>Saddle function</td>
<td>I.103, II.6</td>
</tr>
<tr>
<td>Scale bias</td>
<td>II.90</td>
</tr>
<tr>
<td>Second-order approximation property</td>
<td>I.233</td>
</tr>
<tr>
<td>of translog cost functions</td>
<td>II.56, II.253–58</td>
</tr>
<tr>
<td>Semibounded</td>
<td>I.62, I.384, I.387–89</td>
</tr>
<tr>
<td>Separability</td>
<td>I.60, I.151–82, I.221, I.244 fn, II.10, II.41</td>
</tr>
<tr>
<td>across states</td>
<td>I.356, I.362</td>
</tr>
<tr>
<td>additive</td>
<td>I.158</td>
</tr>
<tr>
<td>approximate</td>
<td>I.255</td>
</tr>
<tr>
<td>input–output</td>
<td>I.60, I.128, I.175, I.302, I.305</td>
</tr>
<tr>
<td>in value-added functions</td>
<td>II.9, II.19, II.55</td>
</tr>
<tr>
<td>of empirical production relations</td>
<td>I.246, II.62, II.63, II.65, II.251</td>
</tr>
<tr>
<td>strong</td>
<td>I.244</td>
</tr>
<tr>
<td>weak</td>
<td>I.245</td>
</tr>
<tr>
<td>Separating hyperplane</td>
<td>I.384</td>
</tr>
<tr>
<td>Separation property (of sets)</td>
<td>I.384, I.386</td>
</tr>
<tr>
<td>Sets</td>
<td>I.383–86</td>
</tr>
<tr>
<td>boundedly polyhedral</td>
<td>I.391</td>
</tr>
<tr>
<td>closed</td>
<td>I.383</td>
</tr>
<tr>
<td>convex hull</td>
<td>I.384</td>
</tr>
<tr>
<td>free disposal hull</td>
<td>I.8</td>
</tr>
<tr>
<td>interior</td>
<td>I.383</td>
</tr>
<tr>
<td>polytope</td>
<td>I.391</td>
</tr>
<tr>
<td>relative interior</td>
<td>I.76, I.384</td>
</tr>
<tr>
<td>semi-bounded</td>
<td>I.62, I.384, I.387–89</td>
</tr>
<tr>
<td>separation property</td>
<td>I.384, I.386</td>
</tr>
<tr>
<td>strictly convex (rotund)</td>
<td>I.16</td>
</tr>
<tr>
<td>unit profit</td>
<td>I.122</td>
</tr>
<tr>
<td>Shadow elasticity of substitution</td>
<td>II.273</td>
</tr>
<tr>
<td>estimates in Norway</td>
<td>II.279</td>
</tr>
<tr>
<td>inconsistent</td>
<td>II.287</td>
</tr>
<tr>
<td>Share of capital</td>
<td>II.128</td>
</tr>
<tr>
<td>Shephard’s lemma</td>
<td>I.14, I.75, I.115</td>
</tr>
<tr>
<td>Shephard–Uzawa duality theorem</td>
<td>I.21, I.115</td>
</tr>
<tr>
<td>Short-run demand functions</td>
<td>II.29</td>
</tr>
<tr>
<td>Short-run profits</td>
<td>I.134</td>
</tr>
<tr>
<td>maximization</td>
<td>I.129</td>
</tr>
<tr>
<td>Specification (of ACMS model)</td>
<td>II.80</td>
</tr>
<tr>
<td>Spot price</td>
<td>I.325</td>
</tr>
<tr>
<td>Steam-electric generating industry</td>
<td>II.73, II.95, II.157</td>
</tr>
<tr>
<td>Strictly neoclassical production function</td>
<td>II.127</td>
</tr>
<tr>
<td>Strongly concave</td>
<td>I.135</td>
</tr>
<tr>
<td>Strongly continuous</td>
<td>I.35</td>
</tr>
<tr>
<td>Strongly lower semicontinuous function</td>
<td>I.31</td>
</tr>
<tr>
<td>Strongly lower (upper) hemicontinuous correspondence</td>
<td>I.35, I.391</td>
</tr>
<tr>
<td>Strongly non-degenerate programming problem</td>
<td>I.376</td>
</tr>
<tr>
<td>Strongly regular</td>
<td>I.353</td>
</tr>
<tr>
<td>Strongly upper semicontinuous function</td>
<td>I.31</td>
</tr>
<tr>
<td>Strong nested profit form</td>
<td>I.353</td>
</tr>
<tr>
<td>Strong separability</td>
<td>I.244</td>
</tr>
<tr>
<td>Strong separation property of sets</td>
<td>I.384</td>
</tr>
<tr>
<td>Structure (of technology)</td>
<td>II.187</td>
</tr>
<tr>
<td>Subdifferential</td>
<td>I.19, I.75, I.394</td>
</tr>
<tr>
<td>Substitutability-scale effect</td>
<td>II.90</td>
</tr>
<tr>
<td>Substitutes</td>
<td>I.48</td>
</tr>
<tr>
<td>Substitution (of inputs)</td>
<td>I.221, I.42, II.131</td>
</tr>
<tr>
<td>Support function</td>
<td>I.385</td>
</tr>
<tr>
<td>Supporting hyperplane (support)</td>
<td>I.16, I.384</td>
</tr>
<tr>
<td>Symmetry of cross-price effects</td>
<td>I.148, II.254</td>
</tr>
</tbody>
</table>
Taylor series I.233
Technical change I.201, I.221
bias II.12, II.128, II.157, II.182-85
capital augmentation II.140
embodied and disembodied II.152-57
factor augmenting I.204
factor saving I.204
Harrod neutral I.202
Hicks neutral I.202
indirect Harrod neutral I.202
indirect Hicks neutral I.202
in steam-electric generation II.158,
II.159, II.168, II.177, II.180, II.196
Technical non-retrogression II.127
Technical progression II.127
Technological structure I.345, II.187
design linear I.346, I.353
Technology I.5
ex ante and ex post I.313, I.324, I.345,
II.189
linear-in-parameters I.346
multi-product II.251
non-joint II.251
putty-clay I.315, II.190, II.208
Technology mapping I.21
Total gauge function I.103
Total profit function I.103
Total price possibility set I.103
Total productivity II.11
rate of change II.12
Transformation function I.227
polar I.303
Transcendental logarithmic forms I.196,
I.238, II.56, II.253
Transcendental production function I.242
Translated technology I.76, I.79, I.155
Two-level structure I.345
Uncertainty (and profits) I.214, I.321
Uniformly increasing (decreasing) I.31,
I.85
Unit cost frontier I.115, I.124
Unit cost set I.115
Unit value-added cost function II.37
Upper hemicontinuous correspondence
I.63, I.391
Upper semicontinuous function I.31
Utility function II.24
conditional indirect II.25
indirect II.24
macro II.23
Value-added II.92, II.54
and separability II.8, II.61, II.92
double deflation II.7, II.55, II.68
function II.4-6, II.19, II.35-40
imperfect competition II.15
saddle-point property I.103, II.6
value-added cost function II.38
Variable elasticity-of-substitution produc-
tion function I.242, II.88
Variable profit function I.129, II.20,
II.30 fn
Weak homotheticity II.65, II.66
Weakly non-degenerate programming
problem I.376
Weak separability I.245, II.61, II.255
of the translog cost function II.57, II.62,
II.63
Wold's identity II.30
Wong-Viner I.316
Wronskian I.233