#### Adjustment process
- Concept of, 21

#### Algorithmic process
- 18. See also economic activity
- Arbib, M. A., 296, 297, 304
- Arbib–Spira bound, 296
- Arbib–Spira separator set, 304

#### Category theory
- 298

#### Coarseness concept
- 171

#### Competitive mechanism
- 35–40
- Design concepts, illustration of, 37
- Equilibrium conditions, 35
- Privacy preservation in, 38
- Two-dimensional message, 43
- Walrasian allocation, 36

#### Condensation method
- Application, 133
- Mechanism design, 139

#### Condensation Theorem
- 137

#### Condensing functions
- Walrasian, amplified for, 145

#### Design process
- Concepts used, 24
- Problem, 30
- Rectangles method, 24
- Transversals and condensation method, 24

#### Differential separability
- 298, 315

#### Direct revelation mechanism
- 74. See also goal functions

#### Dugundji’s example
- 294

#### Economic activity
- 14, 15. See also mechanism design
- Game-theoretic models, 20

#### mechanism and design
- Tatonnement model, 19
- Resource availabilities, 14
- Economic agent, 14
- Economic analysis. See also static mechanism design
- Game-theoretic models, 23

#### Economic models
- 26

#### Economic theory
- Game form, 16
- Edgeworth box, economy, 31. See also mechanism design
- Environments, economic, 183
- Factored space of, 188
- Euclidean examples, 66
- Euclidean parameter space, 213, 214

#### F-contour contained (Fcc)
- 38, 40

#### F-Equivalence
- 310–13

#### Flagpole method
- 44
- General principles, 117
- Walrasian example, 125

#### F-Optimality
- 148

#### Formal treatment
- OrRM, 209–213

#### Functional Dependence theorem
- 322
- Fw contour contained (Fwcc), 39, 40

#### Gale
- E., 145

#### Gale–Nikaido conditions
- 135

#### Game forms
- 16, 17, 28. See also goal function
- Game-theoretic models, 20, 23
Goal function, 16, 25, 26, 33, 63, 69. See also mechanism design

equilibrium functions, 71

equilibrium message, 70, 72
euclidean case, 64
F-optimal outcome, 72

goal correspondence, 68
OrRM, 216
outcome space, Z, 67
parameter transfer process, 47
verification scenario, 70
Walrasian, 93
Golubitsky, M., 298, 313, 330
Guillemin, V., 298, 313, 330

Hessian amplified, 138
bordered, 136
Hopcroft, J. E., 300
Hurwicz, L., 21, 30, 308, 310

Implicit function theorem (IFT), 135

Indexed product structures, 76. See also mechanism design

Information, dispersion
and privacy preservation, 29, 30
Informational efficiency concept, 46–50, 64, 171, 244–245
covering efficiency, 49
equation efficiency, 165
maximal coarseness and informational size, 165
measure, 82
rRM-Coverings
maximality of, 246
Informational size, 250
Iteration procedure, 88

Jordan, J. S., 298

L-dot, 66
configuration, 114
example, 101–16
Leontief
example, 108
theorem, 306, 322, 324
Leontief and Abelson theorem, 322
Leontief, W., 314, 324

Maskin monotonicity, 10, 283. See also Nash implementability

Mechanism construction, 74–82
by rRM and transversals method
direct revelation, 74
general issues, 109–14
informational efficiency, 244
L-dot, for, 114
mechanisms and indexed product structures, 76
Observational efficiency, 245
parameter transfer, 75
parameter-indexed product structure, unpartitioned, 153–62
Mechanism design, 14, 16, 26, 139, 183. See also economic theory
adjustment process, concept of, 21
algorithmic process, 18, 182
and mechanism, 18–25
basic framework and notation, 184
competitive deriving mechanism, 40
competitive mechanism, 35–40
cost of observation and communication, 22
decentralization, informational, 21
economic agents, 14
environments and goal functions, 25–26
goal function, 25
informational efficiency, 46–50
mechanism theory, two phases of, 183
message exchange process, game forms, 26–29
Nash-implementing mechanisms, 279–289. See also Maskin monotonicity
no veto power, 10, 280
national forest example, 50–62
parameter transfer mechanism, 42
problems, 30–31
process, concepts used, 24
Right RM, 190
Reflexive RM (rRM), 190
rRM construction
observationally efficient, 196
Strategic behavior
dominant strategy implementation, 274
monotonically generated covering, 283
via condensation, 149–52
Walrasian example, 31
Walrasian goal function, 32
Mechanism theory
design phase and, operating phase, 183
two phases of, 183
Mechanism, decentralized
basic concepts, 102
components, 116
construction
transitions, 101–16
decentralization, 184
informationally decentralized, 185
L-dot example, 101–16
process of design, distribute, 186
transversals and other message spaces, 107
Mechanism, designing, 64, 183
and coverings, 186
by Transversals Method, 220–229
competitive and parameter transfer
informational properties, 42
decentralization, 184–186
from covering and partition, 230–44
symmetry, 230
block symmetry, 241
F-contour contained, 187
informational efficiency
components, 170
general considerations, 165–80
informational size and coarseness, 250–62
minimal informational size, 172
results, 165–80
rRM coverings, 175
initial dispersion of information, 29–30
Nash-implementing mechanisms, 279–289
Pareto optimality, 14
Property of rectangularity, 187
section 1.9
graphical presentation, 263–74
set-theoretic formulation, 182
using sets of languages, 182
Euclidean parameter space, 213
Message exchange process
and game forms, 26–29, 27
Message indexed product structure, 42, 62, 65, 77. See also mechanism design
transition to, 101, 103
Method of rectangles (RM), 86
Method of transversals, 66
Mount, K., 21, 22, 300, 304
Mount–Reiter concept of informational
size, 253
Mount–Reiter condensation theorem
amplification, 136, 137
MPS. See message indexed product structure
Nash equilibrium, 28
Nash-implementing mechanisms, 279–289. See also Maskin monotonicity
efficient designing, informationally, 281
no veto power, 10, 280
National forest example, 50–62
federal agency, 50
message indexed product structure, 62
privacy-preserving mechanism, 57, 58
Nikaido, H., 145
N step RM, 194
N-tuple, 67. See environment space
Observational efficiency, 245–246
Optimality criterion
Pareto-optimality, 68
Optimization problem, 69
OrRM
algorithm, 200
rRM covering construction, 197
finite parameter space, 198
Euclidean parameter space, 213
Formal treatment, 209
goal function, 216
Outcome function, 27
Outcome space, Z, 26, 67
Pareto optimality, 67
Parameter indexed product structure,
unpartitioned, 42, 65, 153–62. See also mechanism design
message-indexed product structures,
transitions to, 101–116
Parameter space
euclidean, 65, 213
finite-dimensional, 69
Parameter transfer mechanism, 41
three-dimensional message, 43
Pareto optimality, 14, 22
testing and culling, 15
Partitions
characterizations of, 290–295
Peano function, 253
Privacy preservation mechanism, 38, 49. See also parameter transfer
mechanism:goal function
competitive and parameter transfer, 42
Rectangles Method, 44, 87
F-contour compatibility, 65
labeling, or indexing, 45
parameter space, 65
Rectangles Method (cont.)
phases, 64, 65
rectangular covering, 45
three steps, 45
Reflexive method of rectangles, 65
Reiter, S., 21, 22, 306
Renegotiation Act of 1944, 16, 17
Revelation mechanism, 296
algebraic conditions
theorem of Leontief, 306–307
computational complexity of functions, 299–303
encoded and essential, 310
$F$-Equivalence, 310–12
privacy-preserving mechanisms, 303–310
Rank Conditions, 317
results, 298
separator sets and quotients, 303–306
set-theoretic constructions, 310
topological case, 313–322
differential separability, 315
RM correspondences, 88
rRM construction
observationally efficient, 196
rMR. See reflexive method of rectangles
rRM construction, 196. See also goal function
rRm covering
environments, factored space of, 188
euclidean parameter space, 213
finite parameter space, 198
left rectangles method, 189
maximality of, 246
OrRM algorithm, 197, 200
Right RM, 190
Reflexive RM (rRM), 190
systematic method
euclidean parameter space, 213
systematic process (an Algorithm), 188
rRM construction, two step, 191
SCC. See social choice correspondence
SDR. See system of distinct representatives
Sets language
in mechanism designing, 182
Set-theoretic constructions
revelation mechanism, 310
See also mechanism design
Flagpole example (augmented inner product), 117–25
for partition, 117–25
unique solvability, 129
Walrasian example, 125
Social choice correspondence, 68
Solution concept
Nash equilibrium, 28
Solution messages, 28. See also Nash equilibrium
Sonnenschein, H., 298
Spira, 296, 297, 304
Static mechanism design, 23
System of distinct representatives, 84, 103, 220
TM. See method of transversals
Transversals Methods
and condensation, 77
and other message spaces, 107
Flagpoles, 132
mechanism construction from covering, 66, 220–29
system of distinct representatives (SDR), 220
Trivial condensation, 132
Unique solvability, 130
Universal Method of Designing
construction, of, 83–101
goal function Walrasian, 93
hyperbolic example, 97
informational efficiency
$F$-maximal coarseness, 83
method of rectangles (RM), 86, 87
RM correspondences, 88
Walrasian example, 93
Walrasian, amplified, 33, 145. See also mechanism design
allocation, 36
construction, 126, 140–49
Edgeworth Box Economy, 31
equilibrium conditions
example, 66, 125
goal function, 32, 34, 38
design, of, 31
mechanism, 19
privacy-preserving property, 148
Rectangles method, 44
tatonnement, 19