

Cambridge University Press

978-1-107-08452-0 - Chance, Strategy, and Choice: An Introduction to the Mathematics of Games and Elections

Samuel Bruce Smith

Index

[More information](#)

Index

- 1989–90 NBA MVP Election, 57
- 1990 Irish presidential election, 58
- 1992 U.S. presidential election, 21
- 2000 Florida presidential election, 18
- 2012 U.S. presidential election, 89
- Arrow's Impossibility Theorem
 - proof, 356
 - statement, 272
- Arrow's Principle, 355
- Arrow, Kenneth, 7
- auction, 39
 - dollar, 241
 - sealed bid, 40
 - Vickrey, 249
- backward induction solution, 44, 237
- Banzhaf, John, 93
- Battle of the Sexes, 15
- Bayes' Law, 212
- binary labeling rule, 47
- binary number, 255
 - binary expansion, 288
 - column form, 256
- Birthday Problem, 289
- Blackjack, 32
- Borda, Jean-Charles de, 7
- Borel, Émile, 5
- Bouton's Theorem, 259
- Brams, Steven, 246
- Bridge, 215
- Chain-Store Game, 238
- Chicken, 120
- Chomp, 306
- combinatorial identity, 198
- Condorcet ranking, 319
- Condorcet, Nicolas de, 7, 315
- Craps, 203
- dictating set, 353
- directed graph, 67
 - complete, 67
- dominated-strategy solution, 42
- election, 17
- expected value, 29
- fairness criterion, 175
 - Anonymity, 266
 - Condorcet Loser, 182
 - Condorcet Winner, 177
 - Independence
 - social choice, 268
 - social welfare, 271
 - Majority Loser, 179
 - Majority Winner, 176
 - Minimal Liberalism, 274
 - Monotonicity
 - social choice, 264
 - social welfare, 276
 - Neutrality, 266
 - Nonperversity, 276
 - Pareto
 - social choice, 275
 - social welfare, 271
- game, 11
 - combinatorial, 46
 - equivalence, 347
 - fairness of, 33
 - gambling, 23
 - iterated, 236
 - Misère, 303
 - mixed-strategy, 111
 - outcome, 11
 - partial-conflict, 37
 - payoff, 11
 - pure-chance, 12
 - pure-strategy, 12, 108
 - repeated, 106
 - sequential-move, 12
 - simultaneous-move, 14

- game (*cont.*)
 - subgame, 31
 - sum, 336
 - symmetric, 234
 - takeaway, 47
 - total-conflict, 45
 - win-lose, 12
 - zero-sum, 15
- Gibbard-Satterthwaite Theorem, 79
- Hackenbush, 343
- Hex, 309
- Hotelling-Downs Electoral Game, 130
- Hunting Stag, 247
- impossibility theorem, 268
- Jury Theorem, 100, 316
- Law of Combinations, 164
- Law of Conditional Probability, 168
- Law of Conjunctions and Negation, 161
- Law of the Probability Tree, 26, 170
- Linearity of Expectation, 32, 170
- Mackay's Theorem, 269
- manipulable, 79
- mathematical invariant, 193
- mathematical model, 233
- mathematical statement, 139
 - biconditional, 142
 - conditional, 140
 - conjecture, 140
 - contrapositive, 141
 - converse, 141
 - counterexample, 140
 - existential, 144
 - universal, 143
- maximin strategy, 46, 125
- May's Theorem, 267
- McGarvey's Theorem, 324
- minimax strategy, 125
- Minimax Theorem, 223
 - 2×2 case, 225
 - $2 \times n$ case, 228
 - graphical representation, 226
 - mixed-strategy equilibrium, 223
 - pure-strategy equilibrium, 224
- minimum excluded number, 251
- mixed strategy, 109
- Monte Hall Problem, 281
- myopia, 237
- Nash equilibrium, 120
- Nash, John, 5
- Nim, 5, 258, 340
 - binary representation, 257
 - configuration, 258
 - definition, 49
 - Misère, 304
 - Nim-sum, 338
 - Two-Pile, 49
- Nimble, 312
- nonmyopic equilibrium, 245
- Northcott's Game, 302
- O'Neill's Theorem, 243
- ordinal labeling rule, 251
- paradox
 - Bertrand's Box, 294
 - Bertrand's, 291
 - Condorcet, 79
 - Liar, 152
 - No-Show, 84
 - of the Chair, 87
 - Prisoner's, 293
 - Simpson's, 290
 - St. Petersburg, 295
- Pascal's triangle, 197
- payoff matrix, 14
- perfect information, 43
- permutations, 164
- Poker
 - Betting on Diamonds, 105, 128
 - Bluffing, Calling, and Raising, 112, 227
 - Five-Card Stud, 4, 203
 - hierarchy of hands, 206
 - Straight Poker, 163
- Power Contraction Principle, 357
- Power Expansion Principle, 358
- preference table, 60
 - partial, 351
 - Sen coherent, 361
- Pricing Game, 38
- Principle of Counting, 151
- Principle of Induction, 146
 - for rooted trees, 149
- Prisoner's Dilemma, 38, 119
 - generalized, 250
 - iterated, 236
- probability, 23, 159
 - conditional, 167
 - empirical, 157
 - event, 23, 158

Index

- independent, 169
 - mutually exclusive, 161
- experiment, 23, 158
- sample space, 158
- simple outcome, 158
- tree, 26

- rational play, 51
- Rock-Paper-Scissors, 19
- Roulette, 33

- saddle point, 125
- Sen Coherence Theorem, 361
- Sen's Impossibility Theorem, 274
- Sen, Amartya, 272
- Sleeping Beauty Problem, 283
- Smith set, 74
- social preference, 66
 - transitive, 78
- social preference graph, 67, 324
 - realization, 324
- social welfare method, 69, 270
- Sprague–Grundy number, 253, 310, 337
- Sprague–Grundy Theorem, 340
- strategy stealing, 309
- Subset Takeaway Game, 314

- Taking Chips, 47, 254
- Taylor-Zwicker Theorem, 195
- Theory of Moves, 244
- third-party candidate, 21
- tournament, 321
- transfer votes, 62
- tree
 - A-rooted subtree, 149
 - abridged, 31
 - binary, 152
 - branch, 13
 - branch probability, 26
 - depth, 148
 - end node, 13
 - game, 13
 - path, 148
 - probability, 26
 - root, 13
- Tree Game, 147
- Turning Turtles, 312
- Two-Envelopes Problem, 294

- U.N. Security Council, 188
 - modified, 192
- U.S. Electoral College, 89
- U.S. Senate, 8, 196

- value bet, 212
- Venn diagram, 172
- von Neumann, John, 5
- voting bloc, 18
 - partial, 350
- voting method, 16
 - Approval Voting, 363
 - Black Method, 328
 - Borda Count, 61
 - Bucklin Method, 184
 - Condorcet Method, 331
 - Coombs Method, 65
 - Copeland Method, 74
 - Dictatorship, 63
 - Double Plurality Method, 184
 - Hare Method, 62
 - Kemeny Method, 332
 - Majority Judgment, 366
 - Nanson Method, 331
 - nonpreferential, 363
 - Pairwise Comparisons, 68
 - Plurality Method, 60
 - Range Voting, 370
 - recursive, 367
 - Simple Majority Method, 66
 - Single Transferable Vote, 74
- weak solution, 309
- weakly dominated strategy, 41
- weighted voting system, 92
- Wythoff's Game, 313

- Yahtzee, 173
- yes-no voting system, 92
 - Banzhaf power index, 94
 - critical player, 93
 - equivalence, 191
 - Shapley-Shubik power index, 103
 - trade robust, 193
 - weighted voting system, 92
 - winning coalition, 93

- Zermelo's Theorem, 49
 - for combinatorial games, 301
 - for takeaway games, 146