CAMBRIDGE
Cambridge University Press & Assessment
978-0-521-45206-9 — Sperner Theory
Konrad Engel
Index
More Information

INDEX

active, 142
additive, 345
adjacency operator, 277
adjacent, 5
adjoint operator, 209
admissible functions, 312
affine lattice, 14
affine poset, 13, 152, 164, 175, 261
AK-family, 51
all-one-operator, 276
antiblocker, 87
antiblocking type, 87
antichain, 5
arc, 5
asymptotic product theorem, 319
asymptotic Sperner property, 326
asymptotically normal, 305
atoms, 8
automorphism, 4
AZ-identity, 18

B-family, 93
backward arc, 119
bandwidth problem, 46
Bell number, 15, 273
Bernstein polynomial, 269
Betti sequence, 355
bipartite graph, 16
block, 98, 337
Boolean lattice, 9, 152, 175, 182, 185, 195, 230, 233, 237, 261, 265, 279, 295
Borsuk's conjecture, 69
boundary, 39, 77
breadth first search, 121

canonically compressed, 353
capacity, 117
capacity constraints, 118
capacity of cut, 118
chain, 5
chain product, 9, 114, 171, 175, 182, 195, 230, 306, 328, 332
characteristic function, 6, 305
Chebyshev's inequality, 268
chromatic polynomial, 272
Clements-Lindström theorem, 343
clique, 5
Cohen–Macaulay complex, 355
cointersecting, 7, 27, 93
colored Kruskal–Katona Theorem, 345
colored Macaulay Theorem, 352
coloring, 272
coloring-monotone, 275
commutation property, 232
comparable, 4
complement, 376
complement-free, 94, 378
complementary family, 8, 376
complete intersection theorem, 54
component, 146
compressed, 41, 351
compressed family, 352
compression, 41, 333
connected, 146
consecutive, 91
conservation of flow, 118
continuity theorem, 305
continuous random variable, 304
convex combination, 84
convex hull, 84
cost function, 121
cosupport, 384
counting in two different ways, 16
cover, 5
critical path method, 140
cross-unrelated, 21
cubical lattice, 10
cubical poset, 10, 152, 175, 185, 232
cut, 118
cutset, 19
cyclic permutation, 25

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-0-521-45206-9 — Sperner Theory
Konrad Engel
Index
More Information

dag, 124
decreasing function, 6
def, 124
degree, 4
degree-property, 250
density function, 304
differential poset, 232
digraph, 5
Dilworth's theorem, 116
Dilworth–Greene lattice, 248, 261
dimension of a polytope, 84
directed graph, 5
discrete random variable, 304
disjunctive normal form, 195
distribution function, 304
distributive lattice, 9, 248
dual poset, 6, 7
dual problem, 125
duality theorem, 126
dynamically cointersecting, 382
dynamically intersecting, 382

edge set, 4
edge-isoperimetric problem, 40, 359
edge-labelable poset, 238
EIP, 40
endpoint, 5
entropy, 79
entropy inequality, 79
equilibrium, 146
equipartition, 102
Erdős method, 71
Erdős–Ko–Rado Theorem, 25
essential extreme point, 88
essential facet-defining inequality, 88
Euclidean space, 209
expected value, 140, 305
extreme point, 84

facet, 86
family, 5
fibre, 131
filter, 6
final segment, 345
Fisher's inequality, 61
FKG-inequality, 267
FKG-poset, 270
flow, 117
flow-augmenting path, 119
flow morphism, 157
forward arc, 119
Four-Function Theorem, 265
fractional k-cutset, 125
fractional k-family, 132
fringe vertex, 121
full, 86
full-dimensional, 87
full rank, 211
function lattice, 10
function poset, 10, 152, 164, 171, 175, 185, 232

Gaussian distribution, 305
generalized profile, 352
generalized rank function, 318
generated filter, 6
generated ideal, 6
generating family, 50
geometric lattice, 8, 248
graded poset, 7
graph, 4
graph poset, 14, 231
graph space, 276

Hall's theorem, 180
Hamming graph, 358
Hasse diagram, 5
Hasse graph, 5
Hayman's method, 310
height function, 5
hereditary, 86
homogenous polynomial, 64

i-difference representation, 373
I-level connected, 171
I-log concave, 173
I-normal, 171
i-representation, 368
ideal, 6
incidence matrix, 211, 258
inclusion-unrelated, 21
increasing function, 6
indegree, 250
independence number, 276
independent, 5
independent random variables, 305
induced poset, 6
infimum, 6
initial segment, 345
injective word, 114
inner edges, 39
integral capacity, 118
integral flow, 118
integral random variable, 307
interface, 197
intersecting, 7, 24, 27, 93, 164
interval, 5
inversion poset, 248
involution, 213
isomorphic, 4
isomorphism, 4

j-compressed, 338
Johnson graph, 281
Jordan coefficient, 217
Jordan function, 217

k-cutset, 125
k-cutset property, 152
k-family, 5, 131
k-family problem, 131
k-independent family, 72

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-0-521-45206-9 — Sperner Theory
Konrad Engel
Index
More Information

k-LYM inequality, 150
k-representation, 47
k-saturated, 138, 182
k-shadow, 7
k-Sperner property, 8
k-uniform, 281
Katona's circle method, 26, 91
kernel, 211
key, 3
Kneser graph, 281
Korshunov Theorem, 31
Kruskal–Katona Theorem, 46
KS-independent, 22

L-intersecting, 62, 296
labeled vertex, 119
labeling algorithm, 121
Lagrange function, 146
Lagrange multiplier, 146
lattice, 7
lattice distribution, 309
lattice of noncrossing partitions, 198
Lefschetz adjacency operator, 277
Lefschetz lowering operator, 210
Lefschetz matrix, 211
Lefschetz raising operator, 210
length, 5
level, 7
Lie-algebra, 246
Lie-property, 232
linear lattice, 12, 152, 175, 186, 187, 233, 237, 261, 279, 295
link, 185
little-submodular, 345
Littlewood–Offord problem, 189
locally asymptotically normal, 307
log concave, 8
logarithmically concave, 8
lower shadow, 7
lowering operator, 209
lowering property, 260
LYM-inequality, 17

Möbius function, 255
Möbius inversion, 255
Macaulay poset, 333
Macaulay Theorem, 343
marginal random vector, 79
matching, 5, 179
Max-Flow Min-Cut Theorem, 119
maximal chain, 5
maximal element, 5
maximal family, 5
maximal flow, 118
maximum family, 5
maximum-edge problem, 40, 358
mean, 140, 305
MEP, 40
minimal cut, 118
minimal element, 5
minimal polynomial, 196
mod-k-family, 153
modular, 8
modular geometric lattice, 13, 171, 175, 187, 237
modular lattice, 8, 248
monomial, 195
multilinear polynomial, 66

nested chain order, 198
nested structure of solutions, 44
network, 117
new shadow, 345
noncrossing partition, 198
nontrivial intersecting, 60
normal distribution, 305
normal poset, 149
normalized matching property, 149
NSS, 44

open problems, 27, 29, 67, 93, 114, 148, 162, 187, 189, 193, 199, 207, 246, 248, 253, 261, 389
oracle, 31
orbit, 6
order-lowering operator, 210
order preserving, 6, 324
order-raising operator, 210
ordered k-partition, 21
outdegree, 250
outer edges, 40

p, q-Sperner family, 78
p-group, 251
parameters, 7
parenthesization, 183
parenthesization partition, 185
partially ordered sets, 4
partition lattice, 14, 199, 201, 272, 314, 316, 326
Peck poset, 229
Peck product theorem, 230
Peck quotient theorem, 230
Peck rankwise product theorem, 231
permutation invariant, 91
permutohedron lattice, 248
polyhedral complex, 355
polyhedron, 85
polynomial, 195
polytope, 84
poset, 4
poset of colored subsets, 344
poset of ideals, 244
poset of shuffles, 197
poset of subcubes of a cube, 12, 177, 232
poset of submatrices of a matrix, 12, 232
poset of unordered partitions of an integer, 207
poset space, 209
positive semidefinite, 277
positively weighted, 5

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-0-521-45206-9 — Sperner Theory
Konrad Engel
Index
More Information

potential function, 121
primal problem, 125
prime number theorem, 68
principal filter, 6
principal ideal, 6
probabilistic method, 71
product, 6
product theorem, 168
profile, 7
profile-polytope, 84
Profile-Polytope Theorem, 94
projective space lattice, 13, 152, 175, 187
properly log concave, 307
property C, 232
property T, 222

q-binomial theorem, 279
qualitatively independent, 22, 94, 113
quotient, 6

raising operator, 209
rank, 211
rank compressed, 162, 271, 326
rank function, 7
rank greedy, 356
rank i lowering operator, 258
rank i raising operator, 258
rank of a poset, 7
rank preserving, 226
rank symmetric, 8
rank unimodal, 8
rank-generating function, 7
rank-preserving cover suborder, 248
rank-selected subposet, 7
rank-transitive, 162
ranked basis, 209
ranked Jordan basis, 214
ranked Jordan string, 214
ranked poset, 7
ranked subspace, 216
rankwise product, 7
recognition of order-preserving maps, 32
reduced profile, 84
reflexed Sperner family, 376
regular covering, 150
regular graph, 4
regular poset, 152
regular sequence, 234
relational model, 3
representation flow, 142, 239
representation of $sl(2, \mathbb{C})$, 246
reverse lexicographic order, 40, 334

saddle point method, 312
saturated arc, 118
saturated chain, 5
sc-order, 180
scalar product, 209
segment, 345
self-adjoint, 277
self-complementary, 94, 379
semi-Peck poset, 231
semi-sc-order, 199
semiantichain, 187
semimodular, 8
semisymmetric chain, 198
shadow, 7
shadow function, 345
shadow increasing, 349
Shannon complexity, 32, 38
shifted family, 50
shifting, 33
simplicial complex, 355
sink, 117
skew chain order, 189
source, 117
span, 309
special symmetric chain order, 194
Sperner family, 5
Sperner problem, 116, 132
Sperner property, 8, 93
Sperner's theorem, 1
Sperner–Erdős problem, 116
square submatrices of a square matrix, 12, 177, 195, 231
ssc-order, 194
star, 27
star product, 10, 171, 332
starting point, 5
statically cointersecting, 384
statically intersecting, 384
statically t-intersecting, 114
Stirling number, 14, 273
Stirling's formula, 310
strict k-Sperner property, 171
strict product theorem, 173
strictly level connected, 171
strictly log concave, 173
strictly normal, 171
string number, 217
strong cutset property, 152
strong IC-property, 194
strong nested structure of solutions, 45
strong Sperner property, 8
strongly Sperner, 8
subgroup lattice, 251
subparallelepipedons of a parallelepipedon, 11, 171, 175, 232
subword, 114
support, 6, 114, 124, 384
supremum, 6
symmetric Boolean function, 196
symmetric chain, 29, 180
symmetric chain order, 180
symmetric chain partition, 180
symmetric sequence, 8

t-cointersecting, 7
t-intersecting, 7, 281
t-phenomenon, 130

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-0-521-45206-9 — Sperner Theory
Konrad Engel
Index
More Information

Takagi function, 349
Taylor's formula, 310
truncation, 260
two-part Sperner property, 187

uniform, 7
unimodal, 8
unitary Peck poset, 229
unitary semi-Peck poset, 231
upper shadow, 7

valid inequality, 86
value of flow, 118
variance, 305
variance of a poset, 141
variance problem, 141
variational principle, 362
vertex set, 4
vertex-isoperimetric problem, 40, 367
VIP, 40
void, 118

weak flow morphism, 159
weight function, 5
weight of a family, 5
weighted poset, 5
weighted quotient, 6
weighted quotient theorem, 160
Weisner's formula, 256
Whitney number, 7
width, 6

© in this web service Cambridge University Press & Assessment www.cambridge.org