

## Index

- ad hoc networks, 3
- algebraic geometry, 201
  - algebraic independence, 78, 202
  - annihilating polynomial, 202
  - Jacobian criterion, 78, 202
- dominant map, 202
- generic property, 202
- ideal, 201
- variety, 201
  - affine variety, 201
  - Zariski topology, 201
  
- bipartite graph, 87
- bipartite vertex expanders, 87
  
- Cadambe–Jafar (CJ) subspace, 76
- cellular
  - cellular concept, 1
  - cellular network models, 136
  - downlink, 2
  - handoff, 1
  - joint downlink–uplink backhaul design, 155
  - reuse factor, 1
  - uplink, 2, 148
- cognitive radio, 4
- convex combination of transmission schemes, 130
- coordinated multi-point (CoMP), 3, 71
  - average transmit set size constraint, 126
  - CoMP reception, 149
  - flexible message assignments, 145
  - interference-aware cell association, 96
  - local cooperation, 81, 104
  - maximum transmit set size constraint, 71
  - message assignment strategy, 79
  - spiral message assignment, 80
  - string defining message assignment strategy, 168
  - universally optimal message assignment, 174
  - useful message assignments, 104, 167
  - with no CSIT, 185
    - receiver cooperation, 190
  - with no extra backhaul load, 127
- degrees of freedom (DoF), 50, 71
  - achievable DoF, 56, 72
  - cooperation gain, 81
  - per-user DoF, 72
  - symmetric DoF, 188
  - upper bound with CoMP, 82
- derived channel, 72, 73
- distributed power control, 68
- dynamic interference management, 165
  - atomic subnetworks, 167
  - role of cooperation, 180
  - universally optimal message assignment, 174
  - with CoMP transmission, 174
- entropy power inequality (EPI), 198
- extremal inequalities, 194, 196
  
- finite diversity, 56
  - finite time/frequency diversity, 59
- frequency-division duplex (FDD), 64, 185
  
- genie-aided channel, 13
  - smart genie, 17, 20, 43
  - useful genie, 14, 20, 43
  - vector genie, 42
- heterogeneous networks, 184
  
- interference alignment, 52
  - alignment conditions, 57
  - asymptotic interference alignment, 53, 76
  - interference space, 55, 77
  - linear precoding, 52
  - with CoMP transmission, 71
  - zero-forcing, 53, 74
- interference channel with block erasures, 166
  - with CoMP transmission, 174
- iterative methods for interference management, 61
  - convergent Max SINR algorithm, 66
  - Max SINR algorithm, 65
  - Min Leakage algorithm, 63
  - Peters–Heath algorithm, 64
  - reciprocal channel, 63
  - with CoMP, 90

- KKT conditions, 20
- locally connected networks, 95
  - cellular network models, 136
  - two-dimensional Wyner network, 136
  - Wyner's linear network, 98, 156
- log-sum-exp function, 199
- low interference regime, 19, 25, 28, 30, 45
- many-to-one interference channel, 38
- message passing model, 152
- minimum mean squared error estimation (MMSE), 193
- multiple antennas
  - constant MIMO channel, 57
  - multiple-input multiple-output (MIMO) channel, 3, 6
  - multiple-input single-output (MISO) channel, 6
    - with CoMP transmission, 109
  - single-input multiple-output (SIMO) channel, 6
  - one-shot zero-forcing, 97, 143
  - one-to-many interference channel, 39
  - orthogonality principle, 193
- pigeonhole principle, 84
- random matrix, 186, 203
  - physical alignment, 187
- single-round simulation (SRS), 191
- SISO interference channel, 24
- structural matrix decomposition, 150
- successive interference cancellation, 67
- sum capacity, 7, 37
- TDMA (time-division multiple-access), 1, 97, 168
- time-division duplex (TDD), 61, 185
- topological interference management (TIM), 186
  - physical alignment, 187
  - sparse subspace, 187
- two-user interference channel, 8