INDEX

A posteriori probabilities, 3, 7, 8, 41
Binary Symmetric Channel (BSC), 3, 4, 22, 35, 63, 64-66
Binary Symmetric Threshold Channel, 22
Block length of code, 4
Bose-Chaudhuri Codes, 7, 64
Chernov bound, 25-27
derivation, 80-82
Closed path of matrix, 92
Coding theorem, Noisy Channel, 1, 2
Computational cutoff rate, R_comp, 7, 52
Computer simulations, 6, 63-73
Computer time for simulation, 63
Construction procedure for low-density matrices, 94-97
Convergence of error probability with iterations, 48-51, 61, 62
Convolutional codes, 7
Decoder, 1
Decoding, computation, 7, 8, 41, 45
maximum-likelihood, 23, 41
number of iterations, 45, 91
probabilistic scheme, 6, 42, 57
simple scheme, 6
Discrepancy function, 24
Distance function, 9
for A\textsuperscript{n}ary alphabet, 53, 55
for equiprobable ensemble, 10
for low-density ensemble, 13
Distribution function of log-likelihood ratios, after decoding iteration, 52
for Gaussian channel, 67
for Rayleigh fading channel, 72
Elias, P., 2, 4, 9, 35
Encoder, 1
Equipment complexity, 2, 41
Equi-probable ensemble of codes, 9
Error detection, 8
Experimental results, 6, 63-73
Expurgated ensemble, low-density codes, 18
Expurgated random ensemble, 18, 34
Fano, R. M., 7, 34
Feedback and retransmission, 7, 8
Gaussian noise channel, 22, 56, 63, 66-70
Gilbert bound, 11
Gorenstein, D., 7
Log-likelihood ratios, 46, 66, 71
Low density, ensemble of codes, 12
ensemble of matrices, 12
expurgated ensemble, 18
matrices, 12
maximum rate, 39
parity-check codes, 4
Massey, J. L., 7
Maximum-likelihood decoding, 23, 41, 56
Minimum distance, 5, 9
related to correctable crossovers, 37
ratio, typical, 17
Minimum-distance distribution function, A\textsuperscript{n}ary alphabet, 55
equiprobable ensemble, 11
low-density ensemble, 16, 76
Modeling of channels, 2
Moment-generating functions, 14, 25, 26, 54
Noisy Channel Coding theorem, 1, 2, for parity-check codes, 2
Optimum code, 70
Orthogonal equal energy signals, 56
Parallel decoding computation, 46
Parity-check codes, 3
Coding theorem, 2, 4
matrix, 4
Parity-check set, 4
tree, 19, 42, 47
Peterson, W. W., 7
Pierce, J. R., 71
Probability of decoding error P_e, 1, 17, 29
as affected by minimum distance, 34
equiprobable ensemble, 32
low-density ensemble, 38
Probability of even number of events, 43
Pseudorandom number generators, 63
Rate of a code, 3
Rayleigh fading channel, 22, 56, 63, 70-73
Receivers, decision, 6, 67, 69, 73
likelihood, 6, 66, 67, 69, 73
Reiffen, B., 2, 14
Scrambling, 72
Sequential decoding, 7, 52
Serial decoding computation, 46
Shannon, C. E., 1
Signal energy (E_s, E_c), 67, 68
antipodal, 68
orthogonal, 68
Source, information, 1
Stirling approximation, 10
Symmetric binary-input channel, 3, 21
Symmetry, of f(y), 23, 56
of transition probabilities, 21, 56
Threshold decoding, 7
Time diversity for Rayleigh fading channel, 72
Uncertainty of received parity check, 40
Wozencraft, J. M., 7
Z transform, 59
Zierler, N., 7