

Index



The number attached to a much-used technical term indicates the page where the term is first introduced

- Ackermann, R., 208
- action and belief, 150–7
- acts of guessing, 154
- admissible estimates, 163–5
- after-trial betting, 87–93
- algebra
 - Boolean, 30, 123
 - sigma-, 30, 123
- Anscombe, F. J., 93
- antisymmetry (in the logic of support), 31
- Arbutnot, J., 68–73
- axioms
 - absolute support (Kolmogoroff), 123
 - betting rates (Kolmogoroff), 178, 194–5
 - chances (Kolmogoroff), 17–18
 - relative support (Koopman), 29–30
- Barnard, G.
 - on kinds of trial, 80
 - on likelihood, 52
 - on subjective statistics, 207
 - on the likelihood principle, 58, 202
- Bayes, T., 59, 102, 174–91
 - assumptions about betting rates, 177–8
 - definition of probability, 176–7
 - postulate of, 182–5
- before trial betting, 87–92
- belief and action, 150–6
- belief-guesses, belief-estimates, 154
- Bernouilli, Daniel, 57, 162
- Bernouilli, James, 22
- Bernouilli, Nicholas, 69
- betting, before- and after-trial, 87–90
 - on hypotheses, 192–8
 - rates
 - axioms for, 178–91, 194–5
 - Bayes' use of, 177–80
- Birnbaum, A., 58, 100, 203
- Boolean algebra, 30, 123
- Box, G. E. P., 190
- Braithwaite, R. B., 9, 45, 67, 104, 200
 - theory of chance, 104–7
- Brillinger, D., 138–9
- Brown, G. Spencer, 121
- Cargile, J., 110
- Carnap, R., 152–4, 157, 172
- chance, 9
- chance process, 14, 24
- chance set-up, 12
 - tandem, 180
- chrysanthemum experiment, 80
- Church, A., 109
- collective (von Mises), 5
- completeness
 - of fiducial theory, 142–3
 - of postulates, 32
- compound trials, 19–22
- conditional, 18
- conditional chance, 18
 - trials, 13, 18
- confidence intervals, 146–7
- consistency of fiducial theory, 138
- consistent estimators, 170
- Cournot, A. A., 5, 12
- Cox, D.R., 190
- Cox, R.T., 199
- critical likelihood ratio, 81, 101–3
- cumulative distribution function, 15–16
- cumulative graph, 15
- decision theory, 27–9, 68, 150, 171–3
 - definition, 3–4
- Dempster, A. P., 93, 139
- density function, 16
 - experimental, 61–3, 136–7
- Derham, W., 69

- distribution, 14
 - binomial, 21–2
 - cumulative, 16
 - Normal, 64, 143–6, 167–70
- Dürrenmatt, F., 29
- Dutch book, 194
- efficiency of estimates, 171
- Ellis, L., 5
- epidemics, 1, 9, 78–9
- epistemic utility, 28
- errors, theory of, 143, 161
- estimates and estimators, 26–7, 56, 148–59
 - admissible, 164
 - belief-estimates, 154
 - consistent, 170
 - fiducial argument for, 167–73
 - invariance of, 158
 - maximum likelihood, 44, 55–8, 117, 162, 170–3
 - minimax, 171–2
 - minimum variance, 168–9
 - Savage's criterion for, 165–7
 - scales for, 157–9
 - unbiased, 168
 - uniformly better, 163
- exchangeable events, 196
- expectation, 28, 93
- experimental density, 61–2, 137
- fair stake, 177
- Feller, W., 9
- fiducial argument
 - application
 - to confidence intervals, 147
 - to Jeffreys' theory, 135, 188
 - to Normal distribution, 143–5
 - to theory of errors, 143
 - completeness of, 142–3
 - consistency of
 - inconsistencies in Fisher's form of, 139
 - examples of, 125–8
 - origin of, 122
 - postulates for
 - frequency principle, 124
 - principle of irrelevance, 133
 - structure of, 128–30
- Finetti, B. de, 192–208
 - on axioms for betting rates, 194
 - on betting about hypotheses, 192–8
 - on chance, 195–8
- Fisher, R. A.
 - on Bayes, 185
 - on fiducial argument, 122–47
 - on hypothetical infinite populations, 6, 12, 23, 112
 - on invariance in estimation, 158
 - on likelihood, 50–1, 56, 202
 - on maximum likelihood estimates, 44, 162–3
 - on sampling, 119
 - on sufficient statistics, 73, 100
 - on testing hypotheses, 72–6
- Fraser, D.A.S., 203
- Frege, G., 139, 186
- frequency principle, 124
- Fundamental Lemma of Neyman and Pearson, 85
- Galton, F., 64
- gambling system, impossibility of, 20
- Gauss, K.F., 23, 64, 161–2, 171
- Gödel, K., 33
- Good, I.J., 100
- Goodman, N., 37–8
- Gossett, W.S., 64, 74–5, 103
- guesses and acts of guessing, 154–6
- Halmos, P., 62, 100
- Hewitt, E., 200
- histogram, 15
- Hume, D., 47
- hypothesis
 - statistical, 25
 - unexpected, 204, 207
- hypothetical infinite population, 7, 12, 23–4, 112
- independence, 18–21
- induction, 47, 115
- initial support, 134
- invariance of estimators, 158
- invariant tests, 88–90
- irrelevance, 130–47
 - principle of, 133, 137
- Jeffreys, H.
 - on axioms for probability, 8, 123, 199
 - on chance, 10
 - on initial probabilities, 135, 141–2, 185–91
 - on Neyman–Pearson theory, 93
 - on simplicity, 208
 - on the fiducial argument, 129, 135

- joint proposition, 50–2
 - simple, 51
- Kendall, M.G.
 - on D. Bernoulli, 57
 - on likelihood ratio tests, 83
 - on minimum variance estimators, 168–9
 - on random sampling, 119–21
- Kneale, W. C., 10
- Kolmogoroff's axioms
 - for absolute support, 123–4
 - for betting rates, 178, 194–5
 - for chance, 7, 17–18
- Koopman, B.O., 29–32
- Laplace, P.S. de, 71, 161, 184, 187
- law of likelihood
 - continuous case, 63–4
 - discrete case, 53, 59
- learning from experience, 200–1
- least squares, method of, 161
- Lehmann, E.L., 84, 172
- Lexis, W., 64
- likelihood, 50–2
 - given data, 55
- likelihood function, 136–7, 204–5
- likelihood principle, 58–9, 201–4
- likelihood ratio, 63
 - critical, 81, 101–3
 - given data, 63, 137
- likelihood ratio tests, 83–4
- likelihood tests, 81–104
 - critical ratio of, 82, 101–3
 - objections to, 101
- Lindley, D.V., 102, 139, 143
- Loève, M., 3
- logic, the rôle of, 31–4
 - underlying, 31–2, 208
- long run justification, 35–47
- long run rule, 37–42
- Maximum likelihood, 44, 55–8, 117, 162, 170–1
- Menger, K., 14
- Méré, Chevalier de, 68
- Mill, J.S., 199
- minimax argument for long run rule, 38–41
 - in decision theory, 44
 - in estimation, 168
- minimum variance estimates, 168–9
- Mises, R. von, 5–8, 12, 20, 23, 198
- misleading samples, 115–18
- mixed strategy, 44
- mixed tests, 84–90
- models, 7–8, 32
- Moivre, A. de, 64, 69
- moments, method of, 161
- Montmort, P.R. de, 69
- Neumann, J. von, 93
- Neurath, O., 34
- Newton, I., 22
- Neyman, J.
 - on confidence intervals, 146–7
 - on fundamental probability sets, 12
 - on rival hypotheses, 73
- Neyman, J. and Pearson, E.S.
 - Fundamental Lemma of, 85
 - on likelihood ratio tests, 83–4
 - theory of testing, 84–101
 - domain of, 91–2
 - rationale for, 94–5
- Normal distribution, 64, 143–6, 167–8
- optional stopping, 98–100
- outcome (of a trial), 13
 - sure, 14
- partition of data, 131
- Pearson, E.S., 23, 75, 94, 103, *See* Neyman and Pearson
- Pearson, K., 23, 64, 161
- Peirce, C.S., 42, 112
- personal betting rates, 193
 - axioms for, 194–5
- personal probability, 193
- pivotal quantities, 129
- pivotal trials, 128
- Poisson, S.D., 77
- Polya, G., 9
- Popper, K., 9, 13, 111
- populations
 - hypothetical infinite, 6, 12, 23, 112
 - open and closed, 111
- postulational definition, 4–9
- power of a test, 84–90
- predicate, projectible, 37
- Principia Mathematica*, 33, 189
- principle
 - frequency principle, 124
 - likelihood principle, 58–9, 201, 204
 - of indifference, 46, 135, 185, 191
 - of irrelevance, 133, 137
 - of sufficiency, 100

'probability', 2, 14, 26, 125, 193, 207
 probability theory, 7
 process, chance or stochastic, 14
 projectible predicate, 37
 proposition, joint, 51
 pseudo-distribution, 140–2, 187

Quetelet, L.A.J., 64
 Quine, W. v. O., 13

Radon-Nikodym theorem, 62, 100
 Ramsey, F.P., 192–200
 random, 2, 7, 109
 random sampling, 109–21
 random sampling numbers, 118–21
 random sequence, 118–21
 random trials, 109
 random variables, 14
 refutation, 103–4
 Reichenbach, H., 5, 36, 45
 result (of a trial), 12
 Russell, B., 139, 186, 189

s'Gravesande, W.J., 69
 Salmon, W. C., 46
 samples, misleading, 115–21
 sampling, random, 109–21
 with and without replacement, 112–14
 Savage, L. J.
 on axioms for betting rates, 194
 on estimation, 154, 165–7
 on likelihood, 63
 on sufficient statistics, 100
 on the likelihood principle, 58–9,
 201–4
 on unexpected hypothesis, 205
 scales for estimation, 157–9
 Schlaiffer, R., 208
 sequence, random, 110–11
 sequential test, 97
 sigma-algebra, 30, 123
 simple joint proposition, 51
 simplicity, 77, 205, 208
 size of a test, 84–90
 Smith, B. Babington, 119–20
 specification of a problem, 76
 stake, fair, 177
 statistic, sufficient, 73, 100
 statistical data, 50–3, 76, 192
 statistical hypothesis, 25
 stochastic process, 14

strategy, mixed, 44–5
 stringency of tests, 68, 101–3
 Stuart, A. S., 51, 84, 120, 169
 subjective theory on statistics axioms for,
 194–5
 compared with logic of support,
 192–3
 learning from experience in, 200–1
 likelihood principle in, 201–4
 origin of, 192
 unexpected hypotheses, 204–8
 views on chance, 195–8
 subjective v. objective betting rates,
 178–80
 sufficient statistics, 73, 100
 support
 absolute, 122–4
 initial, 134–5, 187–90
 relative, 25–34
 sure outcome, 14
 Stüssmilch, J. P., 69

tandem chance set ups, 180–1
 tests, statistical
 Arbuthnot's, 68–73
 likelihood, 81–104
 likelihood ratio, 83–4
 mixed, 84–90
 Neyman-Pearson, 84–101
 of rival hypotheses, 72–5
 sequential, 97–8
 size and power of, 84–90
 stringency of, 68, 101–3
 unbiased and invariant, 88–90
 uniformly most powerful, 85
 worse than useless, 90
 textual critic's hypothesis, 48
 Tippet, T., 118
 trial, 12
 conditional, 13, 18
 independent, 18–21
 kind of, 12, 79–80
 random, 109
 t-test, 74
 Tukey, J. W., 76

unbiased estimators, 168
 unbiased estimators, tests, 85
 underlying logic, 31–4, 208
 unexpected hypothesis, 204, 208
 uniformly better estimates, 163–5

uniformly most powerful tests, 85–90	waiting time, 59, 140–2
invariant and unbiased tests, 88–90	Wald, A.
unique case rule, 36	on decision theory, 27, 93
urn models, 8, 10, 78	on maximum likelihood, 170–1
example of three hypotheses, 43–7, 54, 155	on minimax estimation, 171–3
utility, 26–9, 177, 186, 194, 201	on sequential tests, 98
epistemic, 28	Whitehead, A. N., 186, 189
variables, random, 14	Williams, R. M., 139
Venn, J., 4, 12, 23	‘worse than useless’ tests, 90
	Wright, G. H. von, 110