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THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1967

Staff:

Professor	-	E.J.Hannan, B.Com.(Melb.), Ph.D.
Readers	-	C.R.Heathcote, B.A.(W.Aust.), M.A.(Melb.), Ph.D. C.C.Heyde, M.Sc.(Syd.), Ph.D. (from 1.8.68.).
Senior Lecturers	-	S.John, B.Sc.(Trav.), Ph.D.(Indian Stat.Inst.). P.Winer, B.Sc.(Rand).
Lecturers	-	J.H.T.Morgan, B.A.(Cantab.), M.Sc.(Case Inst.Tech.). N.F.Nettheim, B.Ec.(Syd.), M.Ec., Ph.D.(Stanford). E.Seneta, M.Sc.(Adel.). R.D.Terrell, B.Ec.(Adel.).
Temporary Lecturer	-	D.R.McNeil, M.Sc.(Tas.), Ph.D. (from 1.2.67. to 31.12.67.).

Introduction:

The Statistics Department is concerned with teaching and research in probability and statistics, including operational research. Thus it is concerned with the study of systems in whose behaviour chance plays a major part. Somewhat uniquely it is responsible for all teaching in the subject both to economists and to students in Arts and Science, those students coming from the two last named faculties including students whose interests are primarily mathematical. In 1968, for the first time, a unit of operational research will be offered.

Research has been substantially concentrated on the theory of stochastic processes (systems whose behaviour through time is governed by chance laws) including what is usually called time series analysis and some rather applied theories (for example stochastic processes associated with road traffic problems). The theory of stochastic processes has a wide application in industry (queueing and renewal theory), in natural science (genetics, communication systems, control theory), in social science (analysis of economic time series) and has a profound mathematical content.

Teaching Programme, 1967:

TABLE 1

Subject	Initial Enrolment	Number Examined	HD	D	Cr$^{\alpha}$	Pass$^{\beta}$	Fail$^{\gamma}$
Statistics I	165	133	1	2	19	58	53
Statistics II	41	39	1	2	7	15	14
Statistics III	21	16	1	3	4	8	-
Master's Prelim.	2	2	-	-	-	1	1
Master's Thesis	6	1	-	-	-	1	-
Ph.D.	2	-	-	-	-	-	-
	227	191	3	7	30	83	68

α Including Pass with Merit.

β The pass here is in the first half of the preliminary course.

γ Including exclusions and students absent from examination.

TABLE 2

Failure Rates, %, for those sitting for examinations

	Statistics I	Statistics II	Statistics III
1966	34	36	20
1967	33	29	0

Staff:

The department was fortunate in being able to recruit Dr.C.C.Heyde to a readership, vacant because of Dr.Ewens' move to the chair at La Trobe. Dr.Heyde had been offered two chairs in Australia.

Professor Hannan was elected a member of the International Statistical Institute. He spent 6 weeks in USA and UK on sabbatical leave.

Research Programme:

(1) Fourier methods and stochastic processes (Cheong, Hannan, McNeil, Nettheim, Terrell, Tuckwell). Statistical problems associated with frequency response, estimation of coherence, seasonal adjustment of data using Fourier methods.

(2) Fluctuation Theory (Heathcote, Winer). Rate of convergence problems related to the central limit theorem applied to fluctuation theory.

(3) Markov Processes (Seneta). Non negative matrices, branching processes, genetical problems.

(4) Operational Research (Morgan, McNeil). Highway traffic problems.

(5) Multivariate Analysis (John).

(6) Sample Survey Theory (John).

(7) Econometrics (Terrell).

Publications:

Hannan, E.J. The measurement of a wandering signal amid noise. Journal of Applied Probability, 4, 1967, 90-102.

Hannan, E.J. Canonical correlation and multiple equation systems in economics. Econometrica, 35, 1967, 123-138.

Hannan, E.J. The estimation of a lagged regression relation. Biometrika, 54, 1967, 315-324.

Heathcote, C.R. Complete exponential convergence and some related topics. Journal of Applied Probability, 4, 1967, 217-256.

Heathcote, C.R., Seneta, E. and Vere-Jones, D.$^{\emptyset}$ A refinement of two theorems in the theory of branching processes. Theory of Probability and Applications, 12, 1967, 341-346.

John, S. Estimators for the comparison of sampling design. Australian Journal of Statistics, 9, 1967, 55-56.

McNeil, D.R.$^{\emptyset}$ The detection of a non-stationary signal in noise. Australian Journal of Physics, 20, 1967, 325-340.

McNeil, D.R.$^{\emptyset}$ Estimating the covariance and spectral density functions from a clipped stationary time series. Journal of the Royal Statistical Society, B, 29, 1967, 180-195.

McNeil, D.R.$^{\emptyset}$ Efficiency loss due to grouping in distribution-free tests. Journal of the American Statistical Association, 62, 1967, 954-965.

Seneta, E. On imbedding discrete chains in continuous time. Australian Journal of Statistics, 9, 1967, 1-7.

Seneta, E. On the transient behaviour of a Poisson branching process. Journal of the Australian Mathematical Society, 7, 1967, 465-480.

Seneta, E. and Vere-Jones, D.♯ On quasi-stationary distributions in discrete-time Markov chains with a denumerable infinity of states. Journal of Applied Probability, 3, 1966, 403-434.

♯ A member of the Department of Statistics, IAS.

♂ Based on work done while a member of the Department of Statistics, IAS.