PETER LAWRENCE FALB

Professor of Applied Mathematics
Division of Applied Mathematics
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EDUCATION

All education received at the Department of Mathematics, Harvard University, Cambridge, MA from 1953 to 1961.

Degrees: A. B. June 1956 (Highest Honors)
M.A. June 1957
Ph.D. June 1961

FELLOWSHIPS

1954-1956 John Harvard (non-stipendiary)

1956-1959 National Science Foundation

PROFESSIONAL ACTIVITIES

Honorary and Professional Societies

Phi Beta Kappa, American Mathematical Society, Sigma Xi, SIAM, IEEE

Committees and Editorial Activities

Secretary, Nonlinear and Optimal Systems Committee, IEEE/PGAC 1964-1969
Member, Stochastic Systems Committee, IEEE/PGAC 1965-1970
Associate Editor, J. SIAM on Control, 1965-1974
Reviewer, Math. Reviews, 1965-
Member, Stability Theory Committee, IEEE/PGAC 1966-1969
Reviewer, Computing Reviews, 1968-
Member, Corporation of Museum of Science, 1978-1996
Member, Overseers Visiting Committee, Department of Mathematics, Harvard 1991-

EMPLOYMENT

January 1969 – present	Professor, Division of Applied Mathematics Brown University
September 2000-January 2001	Visiting Professor Department of Electrical Engineering Massachusetts Institute of Technology
September 1993-June 1994	Visiting Professor Department of Electrical Engineering Massachusetts Institute of Technology
September 1986-June 1987	Visiting Professor Department of Electrical Engineering Massachusetts Institute of Technology
September 1979-June 1980	Visiting Professor Department of Electrical Engineering Massachusetts Institute of Technology
Summers 1971, 72, 76, 78	Visiting Professor Lund Institute of Technology Sweden
January 1973-June 1973	Visiting Professor Department of Electrical Engineering Massachusetts Institute of Technology
January 1967-Jaunary 1969	Associate Professor Division of Applied Mathematics Brown University (Research and Teaching in Applied Math)
February 1966-	Consultant: Bolt, Beranek, and Newman, Inc. (Consulting on Control and Displays)
January 1966-January 1967	Associate Professor Information and Control Engineering University of Michigan (Research and Teaching in Control)
September 1965-June 1970	Consultant: NASA Electronics Research Center (Research on Modeling of Human Operators and general consulting)

August 1965-December 1965	Staff Member, MIT Lincoln Laboratory (Research on Control)
May 1965-August 1965	Visiting Associate Professor Department of Aeronautics and Astronautics Stanford University (Teaching of Modern System Theory)
April 1960-May 1965	Staff Member, MIT Lincoln Laboratory (Research on Optimal Control, Control Theory and Mathematics)
June 1959-September 1959	Staff Member, MIT Lincoln Laboratory (Design and Specification of Data Processing System)
June 1958-September 1958	Staff Member, MIT Lincoln Laboratory (Design and Coding of a Recording Program)

RESEARCH INTERESTS

Systems science and engineering, particularly algebraic and geometric methods, parametric dependence, numerical methods, multivariable linear systems and infinite dimensional stochastic systems. Control and stability theory and mathematics of investment.

PUBLICATIONS

On differential in function field, O. Zariski and P Falb, American Jounral of Mathematics, 83, 542-556, 1961.

On the behavior of the geometric genus under ground field extension, P. Falb, American Journal of Mathematics, 84, 421-432, 1962.

Time optimal control for plants with numerator dynamics, M. Athans, P. Falb, R. Kalman and E. Lee, Institute of Electrical and Electronics Engineers, Professional Group on Automatic Control Transactions, AC-7-47-50, 1962.

Time optimal control of a spinning space Body, M. Athans, P. Falb, and R. Lacoss, Institute of Electrical and Electronics Engineers Transactions on Applications and Industry, 67, 204-214, 1963.

Time-, fuel-, and energy-topical control of nonlinear norm-invariant systems, M. Athans, P. Falb and R. Lascoss, Institute of Electrical and Electronics Engineers, Professional Group on Automatic Control Transactions, AC-8, 196-202, 1963.

Time optimal control for a class of nonlinear systems, M. Athans, and P. Falb, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-8, 378-379, 1963.

Optimal control of self-adjoint systems, M. Athans, P. Falb, and R. Lacoss, Institute of Electrical and Electronics Engineers Transactions on Application and Industry, 83, 161-166.

A direct constructive proof of the criterion for complete controllability of time-invariant linear system, P. Falb and M. Athans, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-9, 1989, 1963.

Infinite dimensional control problems I: on the closure of the set of attainable states for linear systems, P. Falb, Journal of Mathematical Analysis and Applications, 9, 19-22, 1963.

A simple local sufficiency condition based on the second variation, P. Falb, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-10, 348-350, 1965

Reachability of subspaces, P. Falb, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-10, 472-473, 1965.

"Optimal Control: An Introduction to the Theory and its Applications," M. Athans and P. Falb, McGraw-Hill Book Company, New York, 879 pp, 1966. Republished by Dover, 2007.

Remarks on the infinite dimensional Riccati equation, P. Falb and D. Kleinman, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-11, 534-537, 1966.

A note on coverings over imperfect ground fields, P. Falb, American Journal of Mathematics, 88, 447-453, 1966.

One-dimensional minimum time rendezvous for a thrust limited rocket, G. Anderson P. Falb and A. Robinson, American Institute of Aeronautics and Astronautics Journal, 5, 1017-1019, 1967.

On cross correlation bounds and the positivity of certain nonlinear operators, P. Falb and G. Zames, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-12, 219-221, 1967.

*On the stability of systems with monotone and odd monotone non-linearities, G. Zames and P. Falb, Institute of Electrical and Electronics Engineers Professional Group on Automatics Control Transactions, Ac-12, 221-223, 1967.

Infinite dimensional filtering: the Kalman-Bucy filter in Hilbert space, P. Falb, Information and Control, 11, 102-137, 1967.

Decoupling in the design and synthesis of multivariable control systems, P. Falb and W. Wolovich, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control, AC-12, 651-659, 1967. [Also in Proceedings of the 1967 Joint Automatic Control Conference, Philadelphia, PA].

*Stability conditions for systems with monotone and slope-restricted nonlinearities, G. Zames and P. Falb, Society for Industrial and Applied Mathematics Journal on Control, 6, 89-108, 1968. [Also in "Mathematical Theory of Control," edited by A. Balakrishnan and L. Neustadt, Academic Press, New York, 313-426.]

On differentials in locally convex spaces, P. Falb and M. Jacobs, Journal of Differential Equations, 4, No. 3, 44-459, July 1968.

Multipliers with real poles and zeros: An application of a theorem on stability conditions, G. Zames and P. Falb, Institute of Electrical and Electronics Engineers Professional Group on Automatic Control Transactions, AC-13, 125-126, 1968.

Topics in Mathematical Systems Theory," R. Kalman, P. Falb and M. Arbib, McGraw Hill Book Company, pp. 358, Vol. 8, 1969.

Conditions for Optimality, P. Falb and E. Polak, in "Systems Theory," edited by L. Zadeh and E. Polak, McGraw-Hill Book Company, pp. 489-511, Vol. 8, 1969.

Dolezal's theorem, linear algebra with continuously parametrized elements and time-varying systems, L. Weiss and P. Falb, Journal of Mathematical Systems Theory, Vol. 4, NO. 1, 67-75, 1969.

A generalized transform theory for causal operators, P. Falb and M. I. Freedman, Society for Industrial and Applied Mathematics Journal on Control, Vol, 7, No. 3, 452-471, 1969.

A multipoint method of third order, W. Bosarge and P. Falb, Journal of Optimalization Theory and Application, Vol. 4, 156-167, 1969.

A Hilbert space stability theory over locally compact abelian groups, M. I. Freedman, P. Falb, and G. Zames, Society for Industrial and Applied Mathematics Journal on Control, Vol. 7, No. 3, 479-495, 1969.

Input-Output stability: A general viewpoint, P. Falb, M. I. Freedman, and G. Zames. Fourth Congress of the International Federation of Automatic Control, Warsaw, Poland, June 16-21, 1969, Technical Session No. 41, 3-15.

"Some Successive Approximation Method in Control and Oscillation Theory," P. Falb and J. de Jong, Vol. 59 in Mathematics in Science and Engineering, Academic Press, New York, p. 240, 1969.

On the structure of multivariable systems, W. A. Wolovich and P. L. Falb, Society for Industrial and Applied Mathematics Journal on Control, Vol. 7, No. 3, 437-451, 1969.

A note on causality and analyticity, M. I. Freedman, P. L. Falb and J. Anton, Society for Industrial and Applied Mathematics Journal on Control, Vol, 7, No. 3, 472-478, 1969.

On a theorem of Bochner, P. Falb, Institut des Hautes Etudes Scientifiques, Volume dedicated to Professor Oscar Zariski, Extrait, Publications Mathematiques, No. 36, 59-67, 1969.

Ito's lemma in infinite dimensions, R. F. Curtain and P. L. Falb, Journal of Mathematical Analysis and Applications, Vol. 31, No. 2, 434-447, 1970.

Infinite dimensional multipoint methods and the solution of two point boundary value problems, W. Bosarge and P. Falb, Numerische Mathematik, Vol. 14, 264-286, 1970.

Transform theoretic approach to the ability of a class of nonlinear partial differential equations, P. L. Falb, M. I. Freedman, and J. Anton, Journal of Differential Equations, Vol. 9, No. 1, 25-45, 1971.

Frequency domain criteria for stability of systems modeled by certain partial differential equations, P. Falb, J. Anton and M. I. Freedman, presented at the symposium IUTAM on "Instability of Continuous Systems," held at Herrenalb, West Germany, September Systems, H. Leipholz Editor, Springer-Verlag, 1971.

Stochastic differential equations in Hilbert space, R. F. Curtain and P. L. Falb, Jorunal of Differential Equations, V. 10, No. 3, 412-430, 1971.

Bochner's theorem in infinite dimensions, P. L. Falb and Ulrich Haussmann, Pacific Journal of Mathematics, Vol. 43, No. 3, 601-618, 1972.

Stability of difference approximations to differential equations, P. L. Falb and G. Groome, Journal of Differential Equations, Vol. 13, No. 1, 48-57, 1973.

Linear Systems and Invariants," P. Falb, Lecture Notes, Control Group, Lund University, Sweden, 1974.

Invariants and canonical forms under dynamic compensation, W. Wolovich and P. Falb, SIAM, J. on Control, 14, 1976.

The role of the interactor in decoupling, P. Falb and W. Wolovich, 1977 Joint Automatic Control Conference, San Francisco.

Invariants and canonical forms under feedback, P. L. Falb and W. Wolovich, Brown University CDS Report LCDS 78-2, 1-46, 1978.

Applications of algebraic geometry in system theory, C. Byrnes and P. L. Falb, American Journal of Mathematics, Vol. 101, 337-363, 1979.

"Applications of Algebraic Geometry in System Theory," P. L. Falb, in preparation.

Stochastic integration in measurable spaces, S. Belbas and P. L. Falb, Zeitschrift fur Wahrscheinlich-keitstheorie und Verwandte Gebiete (Berlin), to appear.

Pole assignment with parameters," V. Eldem, P. Falb and W. Wolovich, in preparation.

Invariants of subsystems under feedback," P. Falb, in preparation.

"Flags, Controllability and the Coordinatization of Systems," P. Falb, in preparation.

"Method of Algebraic Geometry in Control Theory: Part I: Scalar Linear Systems and Affine Algebraic Geometry," P. Falb, Birkauser, 1990.

"Dollar Down-Market Up," E. N. Dane and P. Falb, Brown Economic Review, 1995.

The Main Theorem of Algebraic Linear System Theory, submitted to American Journal of Mathematics, to appear in 1996.

"Methods of Algebraic Geometry in System Theory: Part II: Multivariable Linear Systems and Projective Algebraic Geometry, P. Falb (Birkhauser, 1999).

"Optimal Control: An Introduction to the Theory and its Applications," M. Athans and P. Falb, McGraw-Hill Book Company, New York, 879 pp, 1966. Republished by Dover, 2007.

Graduate Students and Theses

1. Jan L. DeJong, University of Michigan, 1967. Application of Picard's and Newton's Method to the Solution of Two-Point Boundary Value Problems in Optimal Control Theory.

2. Yeheskel Bar-Nes, Brown University, 1969. On the Discrete Control Problem.

3. Wilbur E. Bosarge, Jr., Brown University, 1969. Infinite Dimensional Iterative Methods and Applications.

4. Ruth F. Curtain, Brown University, 1969. Stochastic Differential Equations in a Hilbert Space.

5. John J. Anton, Brown University, 1970. Convolution Equations with Large Input.

6. Ulrich G. Haussman, Brown University, 1970. Harmonic Analysis in Banach Space.

7. William A. Wolovich, Brown University, 1970. A Frequency Domain Approach to the Design and Analysis of Linear Multivariable Systems.

8. William R. Killingsworth, MIT, 1971-71. Application of Contraction Mapping Methods to the Solution of Optimal Control Problems.

9. Stavros Belbas, Brown University, 1979, Stability of Infinite Dimensional Stochastic Systems.

Research Grants

NSF (National Science Foundation)
AFOSR (Air Force Office of Scientific Research)

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