PATRICK MICHAEL FITZPATRICK

Department of Mathematics
University of Maryland, College Park
College Park, MD, 20742
Voice: Office, (301)–405–5128
Voice: Cell, (301)–802–1876
Fax: Office, (301)–314–0827
e-mail: pmf@math.umd.edu

Personal Information

Born in Youghal, Republic of Ireland in March 1946; U.S. and Republic of Ireland citizen

Education

Ph.D. in Mathematics, 1971, Rutgers University
B.A. in Mathematics, 1966, Rutgers University

Professional Positions

1996–2007:	Chair, Department of Mathematics, UMd
1994–1996:	Associate Chair for Undergraduate Studies, UMd
1984–present:	Professor of Mathematics, UMd
1979–1984:	Associate Professor, UMd
1975–1979:	Assistant Professor, UMd
1973–1975:	L. E. Dickson Instructor, University of Chicago
1971–1973:	Courant Instructor, Courant Institute of Mathematical Sciences, N.Y.U.
————	Visiting Professorships
	University of Paris-Orsay, University of Florence
	University of Calabria, Catholic University of Louvain
	Politecnico di Torino

Selected Books

1. *Real Analysis*, coauthored with H.L. Royden, Prentice-Hall, 2010, pp. 1–505+XIII, ISBN-13 978-0-13-143747-0

2. *Advanced Calculus*, Second Edition, American Mathematical Society, 2009, pp. 1–590+XVIII, ISBN 978-0-8218-4791-6

3. *Orientation and the Leray–Schauder Theory for Fully Nonlinear Elliptic Boundary Value problems*, coauthored with J. Pejsachowicz, Memoirs of the American Mathematical Society, Vol 101, Number 483, 1993, pp. 1–129, ISBN 0-8218–2544–5.

4. *Topological Methods for Ordinary Differential Equations*, Lecture Notes in Mathematics, No. 1537, 1993, pp. 1–209, Springer–Verlag, ISBN 3–540–56461–6.

Selected Research Articles

1. P.M. Fitzpatrick, T. Kato and P. Hess, On the local boundedness of monotonic operators, Proceedings of the Japan Academy, Vol. 48, No. 5 (1972), pp. 275-277.

2. P.M. Fitzpatrick, Surjectivity results for nonlinear mappings from a Banach space to its dual, Mathematische Annalen, Vol. 204 (1973), pp. 177-188.

3. P.M. Fitzpatrick and W.V. Petryshyn, Galerkin methods in the constructive solvability of nonlinear Hammerstein equations, with applications to differential equations, Transactions of the American Mathematical Society, Vol. 238 (1978), pp. 321-340.

4. P.M. Fitzpatrick, On nonlinear perturbations of second order elliptic boundary value problems, Mathematical Proceedings of the Cambridge Philosophical Society, Vol. 84 (1978), pp. 143-l57.

5. P.M. Fitzpatrick and J. Alexander, The homotopy of certain spaces of nonlinear operators, and its relation to global bifurcation of the fixed points of parametrized condensing operators, Journal of Functional Analysis, Vol. 34 (1979), pp. 87-106.

6. P.M. Fitzpatrick and J. Alexander, Galerkin approximations in several parameter bifurcation problems, Mathematical Proceedings of the Cambridge Philosophical Society, Vol. 86 (1980), pp. 1-12.

7. P.M. Fitzpatrick, I. Massabó and J. Pejsachowicz, Global several-parameter bifurcation and continuation theorems: a unified approach via complementing maps, Mathematische Annalen, Vol. 263, (1983), pp. 61-73.

8. P.M. Fitzpatrick, I. Massabó and J. Pejsachowicz, A global description of the periodic solutions of some ordinary differential equations, Journal of the London Mathematical Society, (2), 29 (1984), 499-508.

9. P.M. Fitzpatrick and J. Pejsachowicz, An extension of the Leray-Schauder degree for fully nonlinear elliptic problems, Nonlinear Functional Analysis and its applications, Proceedings of Symposia in Pure Mathematics, Vol. 45, Part I, (1986), pp. 425-448.

10. P.M. Fitzpatrick and J. Pejsachowicz, The fundamental group of the space of linear Fredholm operators and the global analysis of semilinear equations, Contemporary Mathematics Series, American Mathematics Society, Vol.72 (1988), pp. 47-87.

11. P.M. Fitzpatrick, The stability of parity and global bifurcation via Galerkin approximation, Journal of the London Mathematical Society, 2 (38), (1988), pp. 153-165.

12. P.M. Fitzpatrick and J. Pejsachowicz, Local bifurcation for C^1-Fredholm maps, Proceedings of the American Mathematical Society, Vol. 109, No. 4 (1990), pp. 995-1002.

13. P.M. Fitzpatrick, J. Pejsachowiczand P. Rabier, Topological degree for C^2-Fredholm mappings, Comptes Rendues de L'Académie de Sciences, Paris (1990), t. 311, Série 1, pp. 711-716.

14. P.M. Fitzpatrick and J. Pejsachowicz, Parity and generalized multiplicity, Transactions of the American Mathematical Society, Vol. 326, No. 1 (1991), pp. 281-305.

15. P.M. Fitzpatrick and J. Pejsachowicz, Nonorientability of the index bundle and several–parameter bifurcation, Journal of Functional Analysis, Vol. 98, No. 1 (1991), pp. 42-58.

16. P.M. Fitzpatrick, J. Pejsachowicz and P. Rabier, Topological degree for proper C^2-Fredholm mappings on simply connected domains, Journal für die reine und angewandte Mathematik, 427 (1992), pp. 1-33.

17. P.M. Fitzpatrick, J. Pejsachowicz and P. Rabier, Orientability of Fredholm families and topological degree for orientable nonlinear Fredholm maps, Journal of Functional Analysis, Vol. 124, No. 1 (1994), pp. 1-39.

18. P.M. Fitzpatrick and Maria Testa, The parity of paths of closed Fredholm Operators, Journal of Differential and Integral Equations, Vol 7, No. 3 (1994), pp. 823-846

19. P.M. Fitzpatrick and J. Pejsachowicz, Dopolnenie otobrayenia v singulliarnoi tochkie maksimalnogo ranga (Complementing a map at a singular point of maximal range), Izvestia Vuzov, Vol 2 (1997), pp. 97–107

20. P.M. Fitzpatrick, J. Pejsachowicz and L. Recht, Spectral flow and bifurcation of critical points, Comptes Rendues de L'Académie de Sciences, Paris, t.325, Série 1 (1997), pp. 743–747

21. P.M. Fitzpatrick, J. Pejsachowicz and L. Recht, Spectral flow and bifurcation of critical points of strongly–indefinite functionals; Part I, General theory, Journal of Functional Analysis , Vol 162, No 1 (1999), pp. 52–95

22. P.M. Fitzpatrick, J. Pejsachowicz and L. Recht, Spectral flow and bifurcation of critical points of strongly–indefinite functionals; Part II, Bifurcation of periodic orbits of Hamiltonian systems, Journal of Differential Equations (in press), pp. 1–24

23. E. Ciriza, P.M. Fitzpatrick and J. Pejsachowicz, Uniqueness of spectral flow, Journal of Mathematical and Computer Modelling, Vol 32, Nos 11–13 (2000), pp. 1495–1501

Current Research Interests

My present research interests center on the study of topological methods in nonlinear operator theory. One aspect of this has been the development of a topological degree for nonlinear Fredholm mappings. The essential novelty of this degree is that it presents a new, precise description of the homotopy property of degree that is needed to establish global bofurcation results for one parameter families of such mappings (see [9], [13], [15] and [16]). Another aspect has been the study of bifurcation criteria for one parameter families of variational problems in which a stable bifurcation criterion has been described in terms of the nonvanishing of spectral flow (see [20], [21], and [22]). Much of this work has been done in collaboration with my friend Jacobo Pejsachowicz of the Politecnico di Torino.

PhD Theses Directed

- Dennis Phillips, *The Existence of Determining Equations and Their Application to Finding Fixed Points of Compact Operators and Error Bounds for Eigenvalue Estimates of Compact Linear Operators*, UMd 1978

- Charles Fletcher, *Multiscale Periodic Homogenization of Certain Elliptic Equations Using Viscosity Solutions*, codirected with L.C. Evans, UMd 1990

- Maria Testa, *The Analytical Index of Families of Unbounded Linear Fredholm Operators and Bifurcation for Families of Nonlinear Operators*, UMd 1992