

Granville Sewell

Ph.D.	1972	Purdue University	Mathematics
M.S.	1977	University of Texas (Austin)	Mechanical Engineering

Professional Experience

Universidad Simon Bolivar	Math. Dept.	1973-75
Oak Ridge National Laboratory	Engineering Technology	77-78
Purdue University	Visiting Faculty	78-79
IMSL, Inc.	Software Designer	79-83
University of Texas-El Paso	Math. Dept. (Assistant Prof.)	83-88
	(Associate Prof.)	88-03
	(Full Professor)	03-
University of Texas Center for High Performance Computing	Systems Analyst	90-91
Fulbright Lecturer in Tucuman, Argentina		Aug-Nov 99
Texas A&M University	Visiting Faculty	2004-06

A. Books

1. "Analysis of a Finite Element Method: PDE/PROTRAN," Springer-Verlag 1985.
2. a. "The Numerical Solution of Ordinary and Partial Differential Equations," Academic Press, 1988.
b. "The Numerical Solution of Ordinary and Partial Differential Equations, second edition," John Wiley & Sons, 2005.
3. a. "Computational Methods of Linear Algebra," Ellis Horwood, Ltd., 1990.
b. "Computational Methods of Linear Algebra, second edition," John Wiley & Sons, 2005.

B. Publications

1. "Mesh Selection for Discrete Solution of Boundary Problems in Ordinary Differential Equations," (with V. Pereyra) Numer. Math. 23 pp261-268 (1975).
2. "An Adaptive Computer Program for the Solution of $\text{div}(p(x,y)\text{grad } u) = f(x,y,u)$ on a Polygonal Region," in The Mathematics of Finite Elements and Applications II, pp543-553, Academic Press, 1976.
3. "Finite Element Solution of Degenerate Interface Problems," (with G. Meyer), in The Mathematics of Finite Elements and Applications II, pp171-181, Academic Press, 1976.

4. "The Influence of Underload Time on Crack Growth Retardation of Aluminum Alloys," (with H.L.Marcus) *International Journal of Fracture* 13, pp247-249 (1977).
5. "A Model for Fatigue Crack Closure Based on Surface Roughness and Residual Strain," (with H.L.Marcus) *Scripta Metallurgica* 11, pp521-524 (1977).
6. "A Finite Element Program with Automatic User-Controlled Mesh Grading," in *Advances in Computer Methods for Partial Differential Equations III, IMACS*, pp8-10 (1979).
7. "TWOPEPEP, a Small General Purpose Finite Element Program," *Angeordnete Informatik* 4 (West Germany) pp249-253 (1982).
8. "LP/PROTRAN, A Problem Solving System for Linear Programming Problems," in *Computer Science and Statistics: Proceedings of the Fifteenth Symposium on the Interface*, North Holland, pp333-338 (1983).
9. "Applications of TWOPEPEP," in *PDE Software: Modules, Interfaces and Systems*, North-Holland, pp225-240 (1984).
10. "High Rayleigh Number Convections with Strongly Variable Viscosity: A Comparison Between Mean Field and Two-Dimensional Solutions," (with D. Yuen, F. Quarenì, U. Christensen), *Journal of Geophysical Research*, volume 90, number B14, pp12633-12644 (December 10, 1985).
11. "The Effects of Excited-State Diffusion and Saturation on the Strong Field Reflection and Transmission Properties of Materials," (with Y. Band), *Journal of Chemical Physics*, volume 84, number 7, pp3617-3623 (April 1, 1986).
12. "Dynamics of Magma Withdrawal from Stratified Magma Chambers," (with F. Spera, D. Yuen, J. Greer), *Geology*, volume 14, pp723-726, (September 1986).
- 13a. "Plotting Contour Surfaces of a Function of Three Variables," *ACM Transactions on Mathematical Software*, volume 14, number 1, pp33-41 (March 1988).
- 13b. "Algorithm 657: Software for Plotting Contour Surfaces of a Function of Three Variables," *ACM Transactions on Mathematical Software*, volume 14, number 1, pp42-44 (March 1988).
14. "An Expandable, Interactively-Accessible FORTRAN Library," *Advances in Engineering Software*, volume 11, number 1, pp12-18 (January 1989).
15. "An Interactive Waveguide Program," proceedings of the Fifth Annual Review of Progress in Applied Computational Electromagnetics pp793-805 (Monterey, Cal., March 1989).
16. "Dynamic Mixing in Magma Bodies: Theory, Simulations, and Implications," (with C. Oldenburg, F. Spera, D. Yuen), *Journal of Geophysical Research*, volume 94, number B7, pp9215-9236 (July 10, 1989).

17. "WAVEGUIDE—An Interactive Waveguide Program," (with S. Cvetkovic), *Advances in Engineering Software*, volume 11, number 4, pp169-175 (October 1989).
18. "Mantle Convection with Internal Heating and Pressure-dependent Thermal Expansivity," (with D. Yuen, A. Leitch), *Earth and Planetary Science Letters*, 102, pp213-232 (1991).
19. "A Finite Difference Method for a Moving-Interface Diffusion- Reaction Problem," (with G. McMath), *Advances in Engineering Software*, volume 13, number 3, pp135-147 (May 1991).
20. "PDE2D: Easy-to-use Software for General Two-Dimensional Partial Differential Equations," *Advances in Engineering Software*, volume 17, number 2, pp105-112 (1993).
21. "Comparison of Two Interactive Finite Element Programs for Analysis of Optical and Microwave Waveguides," (with S.Cvetkovic, F.Fernandez, R.Ettinger, A.Zhao, and J.Davies), *IEEE/OSA J. Lightwave Technology*, volume 12, number 7, pp1112-1120 (1994).
22. "Full Vectorial Simulation for Characterizing Loss or Gain in Optical Devices with an Accurate and Automated Finite-Element Method," (with V.Tzolov, M.Fontaine and A.Delage), *Applied Optics* 36, number 3, pp622-628 (Jan 20, 1997).
23. "Solution of Ground Water Flow Problems with General Purpose and Special Purpose Computer Codes," (with M.Gribb) *Ground Water* 36, number 2, pp366-372 (March-April 1998).
24. "Solving Problems in Computational Physics using a General Purpose PDE Solver," (with R.Fitzgerald) *Computer Physics Communications* 124, pp132-138 (March 2000).
- 25a. "A Mathematician's View of Evolution," *The Mathematical Intelligencer* 22, number 4, pp5-7 (Fall 2000).
- 25b. "Can ANYTHING Happen in an Open System?," *The Mathematical Intelligencer* 23, number 4, pp8-10 (Fall 2001).
26. "Scattering of Electromagnetic Waves from One-Dimensionally Rough Surfaces Containing Surface Resonant Structures," (with A.McGurn and R.Fitzgerald) *Proceedings of the SPIE* 4100, pp14-21 (2000).
27. "Modeling Analysis of the Transport Properties in TEXTOR-DED Lamina Zone with A Finite Element Code," (with M.Kobayashi, K.Finken, T.Eich, D.Reiser and S.Abdullaev) *Contributions to Plasma Physics* 42, number 2-4 (2002) pp163-168.
28. "Simplified Calculation of Constituent Tidal Currents and Height from HF Radar Profiles across the Mouth of Bays and Sounds," (with R.Fitzgerald and D.Barrick) *Proceedings of the IEEE/OES Seventh Working Conference on Current Measurement Technology*, 2003.

29. "Modeling Approach to a 3D Simulation of Transport in TEXTOR-DED Laminar Zone with a Finite Element Method," (with M.Kobayashi, D.Reiser, K.Finken, S.Abdullaev) *Journal of Nuclear Materials* 313-316 (2003), 1056-1060.
30. "Modeling of the Field Line Penetration and Force Transfer by the Dynamic Ergodic Divertor of TEXTOR," (with K.Finken, S.Abdullaev, M.Jakubowski, M.Lehnen), *Nuclear Fusion* 44, (2004), S55-S63.
31. "Thermal Structure, Coupling and Metamorphism in the Mexican Subduction Zone beneath Guerrero," (with V.C.Manea, M.Manea, V.Kostoglodov, C.Currie) *Geophysical Journal International* 158, (2004) 775-784.
32. "Thermo-mechanical Model of the Mantle Wedge in Central Mexican Subduction Zone and a Blob Tracing Approach for the Magma Transport," (with V.C.Manea, M.Manea, V.Kostoglodov) *Physics of the Earth and Planetary Interiors* 149, (2005) 165-186.
33. "Thermal Models, Magma Transport and Velocity Anomaly Estimation beneath Southern Kamchatka," (with V.C.Manea, M.Manea, V.Kostoglodov) in "Plates, Plumes and Paradigms," *Geological Society of America book* (2005), chapter 31, p 388.
34. "Linear Analysis of the Interaction of Rotating Helical Magnetic Perturbations with Tokamak Plasmas Based on the Reduced Two-fluid Model," (with Y.Kikuchi, K.H.Finken, M.Jakubowski, M.Lehnen, D.Reiser, R.C.Wolf), *Contributions to Plasma Physics* 46 (7-9), (2006) 539-544.
35. "Modelling of the Penetration Process of Externally Applied Helical Magnetic Perturbation of the DED on the TEXTOR Tokamak," (with Y.Kikuchi, K.H.Finken, M.Jakubowski, M.Lehnen, D.Reiser and R.C.Wolf, *Plasma Physics and Controlled Fusion* 48, (2006) 169-183.
36. "Intraslab Seismicity and Thermal Stress in the Subducted Cocos Plate beneath Central Mexico," (with V.Manea, M.Manea, V.Kostoglodov), *Tectonophysics* 420, (2006) 389-408.
37. "Experimental and Theoretical Analyses of Penetration Processes of Externally Applied Rotating Helical Magnetic Perturbation Fields in TEXTRO and HYBTOK-II," (with Y.Kikuchi, et. al.) *Plasma Physics and Controlled Fusion* 49 (2007) A135-A143.
38. "Analytical and Numerical Treatment of a Dynamic Crack Model," (with A.Lalegname and A.M. Sändig) *International Journal of Fracture* 152, number 2, (2008) pp97-125.
39. "Solving PDEs in Non-rectangular 3D Regions Using a Collocation Finite Element Method," to appear in *Advances in Engineering Software*.

C. Invited and Contributed Addresses

1. "An Easy-to-Use, Small Finite Element Program which Solves a Large Class of Elliptic, Parabolic and Eigenvalue Problems in General Two-dimensional

- Regions,” Texas Conference on Mathematical Software (Austin, Texas, March 1978).
2. ”A Finite Element Program with Automatic, User-Controlled Mesh Grading,” 15th Annual Meeting of the Society of Engineering Science (Gainesville, Florida, December 1978).
 3. ”IMSL Software for Differential Equations in One Space Variable,” SIAM Sparse Matrix Symposium (Fairfield Glade, Tenn., October 1982).
 4. ”Some Numerical Results with a Generalized Conjugate Gradient Method,” presented to the University of Texas Center for Numerical Analysis (Austin, Texas, June 1984).
 5. ”Preconditioned Lanczos: A Robust Iterative Method,” SIAM conference on Linear Algebra and Applications (Raleigh, NC, May 1985).
 6. ”Vectorizing Large Scalar Codes: Experience with PDE/PROTRAN,” presented to the University of Minnesota Supercomputer Institute (Minneapolis, Minnesota, May 1987).
 7. ”Plotting Contour Surfaces of a Function of Three Variables,” SIAM Annual Meeting (Denver, October 1987).
 8. ”A Finite Difference Method for a Moving-Interface Diffusion- Reaction Problem,” SIAM Annual Meeting (Chicago, July 1990).
 9. ”PDE2D: A General Purpose FEM Code for 2-D Partial Differential Equations”, presented at Lawrence Livermore National Lab. (Livermore, California, March 5, 1993).
 10. ”PDE2D: An Easy-to-use, Interactive Program for the Numerical Solution of PDEs”, presented at the SIAM Annual Meeting (San Diego, July 1994).
 11. Taught 2 week seminar on finite element method at Universidad de Tucuman, Argentina, June 1995, and again June 1996.
 12. Panelist at workshop ”Scalable Software and Problem Solving Environments,” Purdue University, Sept 25-26, 1995.
 13. ”Solving PDEs in the Classroom,” presented at the 8th Annual International Conference on Technology in Collegiate Mathematics (Houston, November 1995)
 14. ”Resolviendo Ecuaciones Diferenciales Parciales por Medio de un Programa General de Elementos Finitos,” invited talk at the Instituto de Calculo, Universidad de Buenos Aires (Buenos Aires, Argentina, November 15, 1999)
 15. Invited talk on PDE2D at University of Sheffield (England) in July 2000.
 16. Invited talk on PDE2D at University of Dusseldorf (Germany) in June 2000.
 17. ”Solving PDEs in Non-Rectangular 3D Regions Using a Collocation Finite Element Method,” invited talk at Texas Tech University, April 11, 2002.

18. "Scattering of Electromagnetic Waves from a Semi-Infinite, Inhomogeneous Dielectric Medium," (with R.Fitzgerald) Progress in Electromagnetics Research Symposium 2002.
19. "Finite Element Calculation of Normal Modes for Tidal Flow Analyses of HF Radar Data in Corpus Christi Bay and Long Island Sound," (with R.Fitzgerald, D.Barrick and F.Kelly) IEEE International Symposium and USNC/URSI National Radio Science Meeting, June 2002.
20. "Un Programa para la Resolucion de Ecuaciones Diferenciales Parciales Generales, con Aplicaciones," invited talk at Universidad Nacional Autonoma de Mexico (UNAM), June 13, 2003.
21. Taught 4 week course "Metodos Computacionales de la Algebra Lineal," Universidad Simon Bolivar, Caracas, Venezuela, June, 2005.
22. "Aplicaciones de PDE2D, Un Programa de Propositos Generales que Resuelve Ecuaciones Diferenciales Parciales," invited talk at Universidad Simon Bolivar, Caracas, Venezuela, July 1, 2005.
23. "Un Programa para la Resolucion de Ecuaciones Diferenciales Parciales Generales, con Aplicaciones," invited talk at the UNAM Centro de Geociencias in Queretero, Mexico, May 17, 2007.
24. "The PDE2D Collocation Finite Element Method," contributed talk at the SIAM Conference "Analysis of Partial Differential Equations" (PD07), Phoenix, Arizona, Dec 10, 2007.
25. Taught two 3-week courses at Universidad Simon Bolivar, Caracas, Venezuela, July 2008: "Metodos Computacionales de la Algebra Lineal," and "Solucion Numerica de Ecuaciones Diferenciales Parciales."