

## VITA OF DIRK PIETER LAURIE

**Biographical details.** Born 5 January 1946 in Cape Town. Married 21 December 1968 to Catherina Elizabeth (Trienke) Opperman. Five sons.

Obtained first degrees up to M.Sc. from the University of Stellenbosch. Obtained Ph.D. (Mathematics: thesis on *Numerical Treatment of the Time Variable in Parabolic Equations*, supervisor Prof. A. R. Mitchell) in 1977 from the University of Dundee.

Employed 1968–1983 as Research Officer (at various levels) at the National Research Institute for Mathematical Sciences of the CSIR in Pretoria (last post held: Head of the Division for Numerical and Applied Mathematics). 1984–2000 Professor at the Potchefstroom University for Christian Higher Education at the Vaal Triangle Campus in Vanderbijlpark. Currently Professor in the Department of Mathematics at the University of Stellenbosch.

### Awards.

**2002:** First prize winner (100% score) in the SIAM 100-Digit Challenge, a competition set by Prof L N Trefethen (Oxford) involving ten hard numerical analysis problems. See the section “Publications reviewed in Mathematical Reviews” below.

**2006:** Havenga Prize for Mathematical Sciences of Die Suid-Afrikaanse Akademie vir Wetenskap en Kuns

### Current Professional Activities.

**South African Society for Numerical Mathematics:** Full Member

**Supervision Committee of the South African Mathematics Olympiad:** Convenor of Third Round subcommittee

**South African Delegation to International Mathematical Olympiad:** Observer (1998), Deputy Leader (1999–2002), Leader (2006)

### Editorships of Journals.

**1986:** Guest Editor, Journal of Computational and Applied Mathematics

**1987–2003:** Member of the Editorial Board, Journal of Computational and Applied Mathematics

**1991:** Guest Editor, Quaestiones Mathematicae

**1999:** Guest Editor, Journal of Computational and Applied Mathematics (Special issue on Numerical Integration)

**Invited Addresses to conferences.**

- 1980:** 23rd Annual Congress of the S. A. Mathematical Society: *Numerical Factorization of Polynomials*
- 1986:** 8th National Congress on Mathematics Education: *Computers in Mathematics*
- 1988:** 14th S. A. Symposium on Numerical Mathematics: *Convergence, Accuracy, and Stopping Rules in Automatic Algorithms*
- 1988:** 31st Annual Congress of the S. A. Mathematical Society: *Algorithms for Automatic Integration*
- 1993:** Conference on Approximation, Orthogonal Polynomials, Quadrature and Special Functions in honor of Walter Gautschi, Purdue University: *Null rules and orthogonal expansions*
- 2000:** 24th S. A. Symposium on Numerical and Applied Mathematics: *Numerical methods for inverse eigenvalue problems*
- 2003:** 27th S. A. Symposium on Numerical and Applied Mathematics: *Numerical calculation of singular oscillatory integrals*
- 2004:** International Conference on Numerical Analysis and Applied Mathematics, Chalkis (Greece): *Challenges in Numerical Computing*
- 2005:** International Conference on Numerical Analysis and Applied Mathematics, Rhodes (Greece): *Old and new ways of computing the Gamma function*

## RESEARCH ACTIVITIES SINCE 1993

**Contributed talks at National Conferences.**

- 1993:** 19th S. A. Symposium on Numerical Mathematics: *Anti-Gaussian quadrature formulas*
- 1994:** 20th S. A. Symposium on Numerical Mathematics: *Periodizing transformations with application to lattice rules*
- 1995:** 21st S. A. Symposium on Numerical Mathematics: *Calculation of Gauss-Kronrod quadrature rules*
- 1997:** National Research and Development Conference of the S. A. Institute of Computer Science and Information Technology: *Design and Implementation of a C++ Package for Two-Dimensional Numerical Integration* (with L. Pluym and R. Cools)
- 1998:** 22nd S. A. Symposium on Numerical Mathematics: *Calculation of Gaussian quadrature rules from two-term recursion coefficients*
- 2001:** 25th S. A. Symposium on Numerical and Applied Mathematics: *Error bracketing pairs of quadrature formulas*
- 2002:** 26th S. A. Symposium on Numerical and Applied Mathematics: *Gaussian Formulas for Refinable Functions – Part 2* (with Johan de Villiers, who presented Part 1)
- 2004:** 28th S. A. Symposium on Numerical and Applied Mathematics: *Calculation of Kronrod-Radau and Kronrod-Lobatto quadrature formulas*

**2005:** 29th S. A. Symposium on Numerical and Applied Mathematics: *Variable precision floating-point considered perilous*

### Talks at International Conferences.

- 1993:** 15th Biennial Conference on Numerical Analysis, Dundee: *Anti-Gaussian quadrature formulas*
- 1994:** 6th International Conference on Computational and Applied Mathematics, Leuven: *Periodizing transformations for numerical integration*
- 1994:** See invited addresses.
- 1994:** Upstate Numerical Analysis Day, Cornell University: *Periodizing transformations for numerical integration*
- 1995:** 16th Biennial Conference on Numerical Analysis, Dundee: *Calculation of Gauss-Kronrod quadrature rules*
- 1996:** 7th International Conference on Computational and Applied Mathematics, Leuven: *Exact difference formulas for linear differential operators*
- 1996:** Conference on Numerical Mathematics, celebrating the 60th birthday of M.J.D. Powell, Cambridge: *Initial values for the inverse Toeplitz eigenproblem*
- 1997:** Joint SAMS-AMS-SAMSA Conference, Pretoria: *Recovery of recursion coefficients from Gaussian quadrature formulas*
- 1997:** 15th IMACS World Conference, Berlin: *Reversing the calculation of Gaussian quadrature formulas*
- 1999:** International Conference on Rational Approximation, Antwerpen: *Quadrature Rules based on Partial Fraction Expansions* (with J.A.C. Weideman, who presented the talk)
- 2000:** 4th Conference on Functional Analysis and Approximation Theory, Maratea: *Gauss-Jacobi-Kronrod quadrature formulas*
- 2003:** 20th Biennial Conference on Numerical Analysis, Dundee: *Ten thousand digits for Trefethen's Problem #5*
- 2006:** 1st Dolomites Workshop on Constructive Approximation and Applications, Canazei: *Calculation of Radau-Kronrod and Lobatto-Kronrod quadrature formulas*
- 2006:** International Conference on Numerical Analysis and Applied Mathematics, Hersonissos: *Fast implementation of the Discrete Pulse Transform* (with C.H. Rohwer)

### Other visits abroad.

- 1994:** Oregon State University (3 days) (Prof. J.A.C. Weideman)
- 1994:** Cornell University (1 week) Visit partially supported by the Department of Computer Science, Cornell University (Prof. L.N. Trefethen)
- 1996:** Durham University (4 weeks) (Dr. Alan Craig)
- 1996:** University of Bergen, Norway (2 days) Visit fully supported by the Centre for High Technology, Bergen (Prof. Terje Espelid)
- 1997:** University of Hildesheim, Germany (3 days) Visit fully supported by Department of Computer Science, University of Hildesheim (Prof. K.-J. Förster)

**2003:** Eidgenössische Technische Hochschule, Zürich (5 days) Visit fully supported by Department of Mathematics (Prof. J. Waldvogel)

**2004:** Visiting professor (3 months) Katholieke Universiteit Leuven, Belgium (Prof. Ronald Cools) Visit fully supported by KU Leuven under the bilateral exchange agreement with University of Stellenbosch.

### Visitors received.

**1993:** Prof. Ronald Cools, Katholieke Universiteit Leuven (6 weeks)

### SUPERVISOR OF THESES

#### Doctoral students.

- (1) C. H. Rohwer, D. Sc. (Potchefstroom University, 1985): *Nodal subspaces of quadratic spline spaces*. Present position: Senior Lecturer, Department of Mathematics, Stellenbosch University.
- (2) L. Pretorius, D. Sc. (Potchefstroom University, 1987): *Gauss-type quadrature formulas for spline functions*. Present position: Associate Professor, Department of Computer Science, University of South Africa.
- (3) E. H. A. Venter, Ph. D. (Potchefstroom University, 1995): *Aanpasbare numeriese integrasie*. (Adaptive numerical integration.) Present position: Senior lecturer, Department of Mathematics, Vaal Triangle Technikon.

#### Masters students.

- (1) M. C. Steenkamp, M. Sc. (University of Pretoria, 1982): *Die numeriese oplos van stelsels polinoomvergelykings*. (Numerical solution of systems of polynomial equations.) Co-supervisor with Prof. J.A. Snyman.
- (2) D. Gerber, M. Sc. (Potchefstroom University, 1996): *Konvergensieversnelling van oneindige reekse*. (Convergence acceleration of infinite series.)
- (3) R. T. Akinola, M. Sc. (Stellenbosch University, 2007): *Numerical indefinite integration using the sinc method*

### PUBLICATIONS REVIEWED IN MATHEMATICAL REVIEWS

See separate attachment containing printout from *MathSciNet*.

Item MR1808574 was selected for the book “Numerical Analysis: Historical Developments in the 20th Century”, edited by C. Brezinski and L. Wuytack, published by North-Holland in 2001.

Item MR2076374 was reviewed in *Science*, was an alternate selection for the Scientific American Book Club, and a German edition is scheduled to be published by Springer in 2006.

## ARTICLES NOT YET REVIEWED

- [1] D.P. Laurie and J.M. de Villiers. Orthogonal polynomials for refinable linear functionals. *Mathematics of Computation*, 75:1891–1903, 2006.
- [2] C.H. Rohwer and D.P. Laurie. The discrete pulse transform. *SIAM Journal on Mathematical Analysis*, 2006. To appear.

## ARTIKELS IN AFRIKAANS

- [1] D. P. Laurie. Numeriese metodes en die sakrekenaar. *Spectrum*, 17(4):27–30, Desember 1979.
- [2] D. P. Laurie. Gaan die linkse alliansies werk? *Finansies en Tegniek*, 39(10):18, 13 Maart 1987.
- [3] D. P. Laurie. Geen werklike vordering vir KP in vyf jaar sedert stigting. *Finansies en Tegniek*, 39(20):15, 15 Mei 1987.
- [4] D. P. Laurie. HNP kan Treurnicht min help: sin vir KP in regse onenigheid. *Finansies en Tegniek*, 39(8):46–47, 27 Februarie 1987.
- [5] D. P. Laurie. Kan 'n mens peil trek op meningspeilings? *Finansies en Tegniek*, 39(14):18, 10 April 1987.
- [6] D. P. Laurie. Só werk wiskundige modelle vir verkiesingsontleding. *Finansies en Tegniek*, 39(8):46–47, 27 Februarie 1987.
- [7] D. P. Laurie. Voorspel uitslag só. *Finansies en Tegniek*, 39(18):44–45, 1 Mei 1987.
- [8] D. P. Laurie. Voorspel verkiesingsuitslag met barometer. *Finansies en Tegniek*, 39(16):46,48, 24 April 1987.
- [9] D. P. Laurie. Wat die onafhanklikes in die verkiesing bereik het. *Finansies en Tegniek*, 39(20):16, 15 Mei 1987.
- [10] D. P. Laurie. Wynand Malan se kans goed; Denis Worrall s'n swak. *Finansies en Tegniek*, 39(12):16,18, 27 Maart 1987.
- [11] D. P. Laurie. Getal en tyd. In M. F. van der Walt, red., *Die nuwe millennium: Angs of ekstase?*, pp. 18–24, Vanderbijlpark, 1999. Vaaldriehoekampus, PU. vir C.H.O.
- [12] D. P. Laurie. Uitdagings in numeriese wiskunde. *Nieuw Archief voor Wiskunde*, V:5(2):142–147, juni 2005. Alhoewel hierdie artikel in 'n Nederlandse tydskrif verskyn het, is die inhoud in (bedagsame) Afrikaans.

**Non-professional activities.**

**Chess:** S. A. Schools champion 1962, provincial colours for Northern Transvaal and Vaal triangle;

**Toastmasters:** Completed CTM (Competent Toastmaster) course; past President of Scientia Toastmasters;

**Tennis:** Plays at elderly social tennis level. Past Chairman of Vanderbijlpark Tennis Club;

**Music:** recorder, Grade 8; active member of NG Helderberg Church Choir;

**Music typesetting:** author of the M-Tx package, available on the Comprehensive T<sub>E</sub>X Archive Network;

**Analysis of election results:** author of several popular articles; appeared on live election night predictions (radio 1974, 1977; TV 1983, 1987, 1989, 1992);

**Quiz shows:** contestant (on radio 1976, 1977; on TV 1977, 1982, 1984);

**Crossword compilation:** has contributed crosswords in Afrikaans to three newspapers, and has won several Internet clue-writing contests.

**Dirk Laurie's Erdős number is at most 3.**

- [1] Paul Erdős and R. Daniel Mauldin. The nonexistence of certain invariant measures. *Proc. Amer. Math. Soc.*, 59(2):321–322, 1976.
- [2] R. J. Gardner and R. D. Mauldin. On the Hausdorff dimension of a set of complex continued fractions. *Illinois J. Math.*, 27(2):334–345, 1983.
- [3] R. J. Gardner, S. Kwapien, and D. P. Laurie. Some inequalities related to planar convex sets. *Canad. Math. Bull.*, 25(3):302–310, 1982.