ABSTRACTS

OF PAPERS PRESENTED

AT THE FIFTEENTH SOUTH AFRICAN SYMPOSIUM ON

NUMERICAL MATHEMATICS

UMHLANGA ROCKS, 17 - 19 JULY 1989

Titles of Papers – Titels van Referate

S. Abelman and D. Eyre. *Rational Methods for Solving Initial Value Problems.*

M.L. Baart. *A Note on the Construction of Continuous Quadric Patches.*

G. Ball. *The Ray-Tracing Procedure in the Solution of the Integrals Arising from the Collision Probability Method.*

R.A.B. Bond, J.R. Mika, and L. Potgieter. *Chemical Kinetics, the Trapezoidal Rule Method and Singular Perturbation.*

B.R. Cannoo and J. van Heerden. *An Algorithm for the Prediction of Particle Paths in Rotating Flow.*

J.M. de Villiers and C.H. Rohwer. *A Nodal Spline Generalization of the Lagrange Interpolant.*

R. de Villiers and J.P. du Plessis. *On the Possible Failure of the Tri-Diagonal Matrix Algorithm.*

F. Dias. *Nonlinear Free Surface Flows.*

A. du Plooy. *A Numerical Solution of the Geoelectrical Problem from Basic Physical Principles.*

D. Eyre and H.G. Miller. *Numerical Treatment of the Time-Independent Schrödinger Equation via a Generalized Gauss Quadrature.*

M. Gutknecht. *1. The Lanczos algorithms and their relation to formal orthogonal polynomials, Padé approximation, continued fractions, and the qd algorithm.*

2. A completed theory of the Lanczos process and related algorithms.

A. Knopfmacher. *Generalized Series Approximations for Functions.*

D.P. Laurie. *Jacobi Methods for Inverse Eigenproblems.*

D.F.B. Louw, G. Delic, and J.D. Neethling. *A Spectral Function Method Applied to Convection-Diffusion Equations.*

D. Lubinsky. *Toeplitz Matrices.*

J.C. Maccelari and P.G.L. Leach. *Closed Form Solutions to the Schrö-dinger Equation for a Screened Coulombic Potential.*

E. Maré. *The Numerical Treatment of Singular Integral Equations.*

H. Murrell. *A Case for Computer Aided Tomography in the Undergraduate Syllabus.*

L. Potgieter. *New Numerical Procedure for Singularly Perturbed Systems of Ordinary Differential Equations.*

B.D. Reddy. *Approximation of Some Dissipative Problems in Mechanics.*

J. Remar. *Variational Inequalities and Flow through Porous Media.*

C.H. Rohwer and J.M. de Villiers. *Approximation Properties of the Quadric Nodal Spline Interpolant.*

E. Rosinger. *An Exact Computation of the Feynman Path Integrals.*

S.W. Schoombie. *Existence and Linear Stability of Period 2 Solutions of Discrete Reaction-Diffusion Models with Various Types of Nonlinear Diffusion.*

W.F.D. Theron. *The Solution of Narrow Banded Systems on a Transputer Network.*

J.J. Thiart, H.J. Viljoen, and K. Kriel. *Development of Thermal Stresses in a Spherical Catalyst Particle.*

O. Ubbink and G.P. van Zyl. *Numeriese-Drukberekening by Eksterne-vloeiprobleme.*

A. van Niekerk. *A Rational Approximation Method for Hyperbolic Conservation Laws.*

H.J. Viljoen, J.E. Gatica, and V. Hlavacek. *Secondary Flows in Chemically Reacting Systems.*

D.L. Vogel. *A Fast, Efficient Nodal Method for Solving the Neutron Diffusion Equation of Reactor Physics.*

J.A.C. Weideman. *Spectral Methods and Mappings for Evolution Equations on the Infinite Line.*

C.J. Wright. *Instability of the Lanczos τ-Algorithm.*

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