conduction equation subject to homogeneous boundary conditions such that $\lambda_1 = 0$.

(i) the solution is bounded as $t \to \infty$, and

(ii) the solution is approached *for all* t by the solution of the Crank Nicolson scheme as $\Delta t \to 0 (\Rightarrow) \Delta x \to 0$.

In this case $\rho(C) = 1$ independent of Δt, in contradiction of the stated necessary condition of Gary (1966).

6. Acknowledgement

In preparing this paper the author was greatly helped by a series of discussions with Dr. R. S. Anderssen.

References

ALBASINY, E. L. (1960). On the numerical solution of the cylindrical heat conduction problem, *Q.J. Mech. Appl. Math.*, Vol. 13, pp. 374–384.

CAMPBELL, C. M., and KEAST, P. (1968). The stability of a difference approximation to a self-adjoint parabolic equation under derivative boundary conditions, *Math. Comp.*, Vol. 22, pp. 336–346.

COPSON, E. T., and KEAST, P. (1966). On a boundary-value problem for the equation of heat, *J. Inst. Maths. Applies.*, Vol. 2, pp. 358–363.

GARY, J. (1960). A generalisation of the Lax–Richtmyer theorem on finite difference schemes, *J. SIAM Numer. Anal.*, Vol. 3, pp. 467–473.

GODUNOV, S. K., and RYABENKI, V. S. (1964). *Theory of Difference Schemes*, North-Holland.

KEAST, P., and MITCHELL, A. R. (1966). On the instability of the Crank Nicolson formula under derivative boundary conditions, *Computer Journal*, Vol. 9, pp. 110–114.

KEAST, P., and MITCHELL, A. R. (1967). Finite difference solution of the third boundary value problem in elliptic and parabolic equations, *Num. Math.*, Vol. 10, pp. 67–75.

KELLER, H. B. (1965). On the accuracy of finite difference approximations to the eigenvalues of differential and integral operators, *Num. Math.*, Vol. 7, pp. 412–419.

LAX, P. D., and RICHTMYER, R. D. (1956). Survey of the stability of linear finite difference equations, *Communications on Pure and Applied Mathematics*, Vol. 9, pp. 267–293.

PARKER, I. B., and CRANK, J. (1964). Persistent discretisation errors in partial differential equations of parabolic type, *Computer Journal*, Vol. 7, pp. 277–292.

PHELPS, C. E. (1962). D.Phil. Thesis (Oxford).

RADOK, J. R. M., and MERRIL, R. F. (1960). Numerical solution of boundary value problems, *ZAMM*, Vol. 40, pp. 202–214.

STRANG, G. W. (1960). Difference methods for mixed boundary-value problems, *Duke Math. J.*, Vol. 15, pp. 221–231.

VARGA, R. S. (1962). *Matrix Iterative Analysis*, Prentice-Hall Inc.

The Computer Journal

Published Quarterly by

The British Computer Society, 23 Dorset Square, LONDON, N.W.1, England.

The Computer Journal is registered at Stationers' Hall, London (certificate No. 24690, June 1966). The contents may not be reproduced, either wholly or in part, without permission.

Subscription price per volume £5. (U.S. $12.00 at $2.40). Single Copies £1 5s. (U.S. $3.00 at $2.40).

All inquiries should be sent to the Secretary at the above address.

Communications: Papers submitted for publication should be sent to E. N. Mutch, The University Mathematical Laboratory, Corn Exchange Street, Cambridge. Intending authors should first apply for *Notes on the Submission of Papers*, as the onus of preparing papers in a form suitable for sending to press lies in the first place with the authors.