or composite.   Boundary value problems, initial value problems and also the more complicated mixed problems are investigated.

Attention is paid both to bi-analytical function theory governed by elliptic systems and to applications in elasticity. The discrete phenomena of the uniqueness of the characteristic problems for hyperbolic systems are discussed; also, the spline finite strip method and some numerical analyses for functional equations are provided.

Readership: Researchers and graduate students working in PDEs, generalized hyperanalytic function theory and functional equations. Also engineers who use the method of PDEs to solve engineering problems, particularly in elasticity and electrostatics.

"MULTIGRID METHODS FOR INTEGRAL AND DIFFERENTIAL EQUATIONS"

By *D.J. Paddon and H. Holstein*

Published by *Clarendon Press*, Oxford, 1985, xii + 323 pp. Stg £30.   ISBN 0-19-853606-2

Many problems in numerical analysis are reducible to the numerical solution of a system of algebraic equations. The multigrid method is a promising new technique for such problems which has been developed since the late 1970s. This volume contains the proceedings of a Summer School/Workshop on Multigrid Methods held at the University of Bristol in September 1983 and attended by many leading researchers in the field (most of the papers were revised later to include the authors' views and research up to July 1984).

BOOK REVIEWS

"THE BOOLE-DE MORGAN CORRESPONDENCE 1842-1864"

By *G.C. Smith*

Oxford Logic Guides, Published by *Oxford University Press*, 1982, Stg £19.00.   ISBN 019-853183-4.

G.C. Smith of Monash University, Australia, has done mathematics and the history of mathematics a great service by editing the 90 or so letters between George Boole and Augustus De Morgan during the period 1842-1864.   Smith has wisely divided the letters into the following categories:

1. Getting acquainted 1842-1845;

2. Mathematical logic and Ireland 1847-1850;

3. Probability and eccentricity 1851;

4. The laws of thought and marriage 1852-1856;

5. Books old and new; and homeopathy 1859-1861;

6. The controversy with Hamilton's successors; and the Jews 1861-1862;

7. From differential equations to spiritualism 1863-1864.

The book also includes short biographies of Boole and De Morgan, extensive commentary on the letters, almost complete bibliographies of both men, an appendix on Boole's theorem on definite integration and a historical epilogue concerning De Morgan's efforts to secure a pension for Boole's widow. All in all, Smith has crammed an incredible amount of information into 156 pages and the volume is handsomely produced by Oxford University Press.

The book contains the text of all the letters available to the author, though not De Morgan's reference for Boole's

application for the professorship in Cork (see [1]).   Smith
has done a very fine job in painstakingly deciphering the
handwriting of both Boole and De Morgan, a difficult job at
the best of times.   He comments with great depth and percept-
ion on both the mathematical and personal content of each
letter and in particular he examines very closely the trains
of thought of both men in the crucial period 1847-1850 while
symbolic logic was taking shape in their minds, albeit in diff-
erent forms.   To my mind, Smith has done a fine job and his
book is indispensible to those interested in either Boole or
De Morgan or indeed the history of mathematics in general.
I can recommend the book very strongly and it should find a
place in every University Library so that students can see
the actual evolution of mathematical concepts.

Much as I would like to give a book such as this unqual-
ified praise, I must draw attention to the number of misprints
and elementary errors it contains.   These are all the more
surprising when one realises that the book has emanated from
Oxford University Press, but thankfully there is nothing that
a careful proof-reading of a second edition could not remedy.
The following is a list of potential corrections:

1. Page 2   Boole was married in 1855 not 1856.

2. Page 3   "obituary" is mispelled.

3. Page 33   Archbishop MacHale's first name was John not
             William.

4. Page 38   "be" should be "by".

5. Page 40   The title of Boole's major work was "An In-
             vestigation of the Laws of Thought", not "An
             Investigation into the Laws of Thought".

6. Page 142 "Edition" is mispelled.

7. Page 148 "Cambridge" is mispelled.

The bibliography of Boole's printed works contains over
twenty errors and slips, all of them minor, which I have att-

empted to correct in [1].

The misprints and errors to which I have referred det-
ract only slightly from the book which I regard as a fine piece
of scholarship and welcome warmly.   Rumour has it that the
author is at present working on a companion volume on the corr-
espondence of Boole and William Thomson, Lord Kelvin.   I look
forward eagerly to its publication.

REFERENCE

1.   MacHALE, Desmond,
     'George Boole - His Life and Work', Boole Press, Dun
     Laoghaire, 1985.   ISBN 0-906783-05-4.

Des MacHale,
University College,
Cork

"THE ONE-DIMENSIONAL HEAT EQUATION"

(Encyclopaedia of Mathematics and its Applications - Vol. 23,
Section : Analysis)

By John Rozier Cannon

A few weeks ago, a colleague presented the following prob-
lem to a number of Applied Mathematicians, including myself:

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2} + f \; ; \qquad 0 < x < 1, \qquad t > 0$$

$$u(x,0) = 0, \qquad 0 < x < 1$$

$$u(0,t) = u(1,t) = 0, \qquad t > 0$$