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Integrations  
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Lovric, Ph.D, is  
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sets) to assist  
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discusses a few

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exercises

reinforce vital  
skills and  
invite

additional self-

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study. Topics  
are presented in  
a logical  
progression,  
with major  
concepts such as  
wave  
propagation,  
heat and  
diffusion,  
electrostatics,  
and quantum  
mechanics placed  
in contexts

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familiar to students of various fields in science and engineering. By understanding the properties and applications of PDEs, students will be equipped to better analyze and interpret central

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processes of the  
natural world.

A self-contained  
introduction to  
the fundamentals  
of mathematical  
analysis

Mathematical

Analysis: A

Concise

Introduction

presents the

foundations of

*Page 103/118*

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analysis and  
illustrates its  
role in  
mathematics. By  
focusing on the  
essentials,  
reinforcing  
learning through  
exercises, and  
featuring a  
unique "learn by  
doing" approach,  
the book  
develops the



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reader's proof  
writing skills  
and establishes  
fundamental  
comprehension of  
analysis that is  
essential for  
further  
exploration of  
pure and applied  
mathematics.  
This book is  
directly  
applicable to

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Proofs such as  
differential  
equations,  
probability

theory,  
numerical  
analysis,  
differential  
geometry, and  
functional  
analysis.

Mathematical  
Analysis is  
composed of

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three parts:

Part One presents the analysis of functions of one variable, including sequences, continuity, differentiation, Riemann integration, series, and the Lebesgue

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integral. A detailed explanation of proof writing is provided with specific attention devoted to standard proof techniques. To facilitate an efficient transition to more abstract

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settings, the  
results for  
single variable  
functions are

proved using  
methods that  
translate to  
metric spaces.

?Part Two

explores the  
more abstract  
counterparts of  
the concepts  
outlined earlier

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in the text. The reader is introduced to the fundamental spaces of analysis, including  $L_p$  spaces, and the book

successfully details how appropriate definitions of integration,

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continuity, and  
differentiation  
lead to a  
powerful and  
widely  
applicable  
foundation for  
further study of  
applied  
mathematics. The  
interrelation  
between measure  
theory,  
topology, and

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differentiation  
is then examined  
in the proof of  
the

Multidimensional  
Substitution

Formula. Further  
areas of

coverage in this  
section include  
manifolds,

Stokes' Theorem,  
Hilbert spaces,  
the convergence



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of Fourier

series, and  
Riesz'

Representation

Theorem. ?Part

Three provides

an overview of

the motivations

for analysis as

well as its

applications in

various

subjects. A

special focus on

*Page 113/118*

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ordinary and  
partial  
differential  
equations

presents some  
theoretical and  
practical  
challenges that  
exist in these  
areas. Topical  
coverage  
includes Navier-  
Stokes equations  
and the finite

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element method.

Mathematical

Analysis: A

Concise

Introduction

includes an

extensive index

and over 900

exercises

ranging in level

of difficulty,

from conceptual

questions and

adaptations of

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proofs to proofs  
with and without  
hints. These  
opportunities  
for  
reinforcement,  
along with the  
overall concise  
and well-  
organized  
treatment of  
analysis, make  
this book  
essential for

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readers in upper-  
undergraduate or  
beginning  
graduate  
mathematics  
courses who  
would like to  
build a solid  
foundation in  
analysis for  
further work in  
all analysis-  
based branches  
of mathematics.

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