

Cambridge University Press
978-0-521-08193-1 - Commutative Algebra
J. T. Knight
Frontmatter
[More information](#)

London Mathematical Society Lecture Note Series. 5

J.T.KNIGHT

Commutative Algebra



CAMBRIDGE AT THE UNIVERSITY PRESS 1971

Cambridge University Press
978-0-521-08193-1 - Commutative Algebra
J. T. Knight
Frontmatter
[More information](#)

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, São Paulo

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9780521081931

© Cambridge University Press 1971

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 1971
Re-issued in this digitally printed version 2007

A catalogue record for this publication is available from the British Library

Library of Congress Catalogue Card Number: 76-152625

ISBN 978-0-521-08193-1 paperback

These notes were put together with scissors and paste from my manuscript, with as many errors corrected as my audience and I could find. I should like to thank everyone who helped, and especially Barry Tennison.

James T. Knight

Dr J. T. Knight died in April 1970 from injuries received in a motor accident. In preparing the notes for publication, I have made some slight amendments; I hope that the original flavour has been preserved. My thanks are due to the London Mathematical Society, and particularly to Professors J. W. S. Cassels and P. M. Cohn for their help.

Barry R. Tennison

October 1970

J. T. Knight

James Thomson Knight was born in Glasgow in 1942. It was in his home city that he began his university education, after he had gained first place in the Glasgow University Entrance Bursary Competition in 1960. Four years later he graduated with first class honours in Mathematics, and, for achieving first place in the final examination, was awarded the Bryce Fellowship.

He then went to Trinity College, Cambridge, where he worked in number theory and commutative algebra under the supervision of Dr. (now Professor) J. W. S. Cassels, leading in 1967 to the degree of Ph.D., and election to a Junior Research Fellowship at Churchill College, Cambridge.

After spending the next year as Lecturer in Mathematics at the United College, Chinese University of Hong Kong, he returned to take up the Fellowship in Cambridge. His research interests were in commutative algebra and ring theory. The list below summarises his published work, which, apart from the first item, some work in physical chemistry done with ICI while he was an undergraduate at Glasgow University, has all appeared in the Proceedings of the Cambridge Philosophical Society.

Dr. Knight died in a car accident in April 1970 while visiting a friend in Ireland.

J. T. Knight's Publications

A kinetic theory of droplet coalescence with application to emulsion stability (with R. A. W. Hill), *Trans. Faraday Soc.* 61 (1965) 170-181.

Quadratic forms over $R(t)$, *Proc. Camb. Phil. Soc.* 62 (1966) 197-205.

Binary integral quadratic forms over $R(t)$, *Proc. Camb. Phil. Soc.* 62 (1966) 433-440.

Cambridge University Press
978-0-521-08193-1 - Commutative Algebra
J. T. Knight
Frontmatter
[More information](#)

Riemann surfaces of field extensions, Proc. Camb. Phil. Soc.
65 (1969) 635-650.

Some rings of interest in the study of places, Proc. Camb. Phil. Soc.
68 (1970) 255-264.

On epimorphisms of non-commutative rings, Proc. Camb. Phil. Soc.
68 (1970) 589-600.

A note on residually finite groups, Proc. Camb. Phil. Soc. 69
(1971).

B. R. T.

Contents

	Page
1. Preliminaries	1
1.1 Introduction	1
1.2 Definitions and recapitulations	1
1.3 Modules	6
2. Flatness	16
2.1 Projective modules	16
2.2 Flat modules	18
2.3 Faithfully flat modules	24
3. Fractions	32
3.1 Rings, modules and algebras of fractions	32
3.2 Localisation	36
3.3 Projective modules and localisation	42
3.4 Submodules of fraction algebras	55
4. Supporting and associated prime ideals	61
4.1 Lengths and ranks of modules	61
4.2 The support of a module	64
4.3 Prime ideals associated to a module	66
5. Integers	72
5.1 Definition of integers	72
5.2 Integers and prime ideals	80

6.	Some geometrical results	85
7.	Valuation rings	89
7.1	Ordered groups	89
7.2	Valuation rings	90
7.3	Extension theorems	94
7.4	An application	99
8.	Prüfer and Dedekind rings	105
9.	General Exercises	113
Appendix 1.	Categories	116
Appendix 2.	The constructible topology	121
Bibliography		124
Indices		125