

Lecture Notes in Mathematics

Edited by A. Dold and B. Eckmann

723

Willy Brandal

Commutative Rings
whose Finitely Generated
Modules Decompose



Springer-Verlag
Berlin Heidelberg New York 1979

Author

Willy Brandal
Department of Mathematics
University of Tennessee
Knoxville, TN 37916/USA

AMS Subject Classifications (1970): 13-02, 13C05, 13F05, 13F10,
13G05

ISBN 3-540-09507-1 Springer-Verlag Berlin Heidelberg New York
ISBN 0-387-09507-1 Springer-Verlag New York Heidelberg Berlin

Library of Congress Cataloging in Publication Data. Brandal, Willy, 1942- The commutative rings whose finitely generated modules decompose. (Lecture notes in mathematics ; v. 723) Bibliography: p. Includes index. 1. Commutative rings. 2. Modules (Algebra) 3. Decomposition (Mathematics) I. Title. II. Series: Lecture notes in mathematics (Berlin) ; v. 723. QA3.L28 no. 723 [QA251.3] 510'.8s [512'.4] 79-15959

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically those of translation, reprinting, re-use of illustrations, broadcasting, reproduction by photocopying machine or similar means, and storage in data banks. Under § 54 of the German Copyright Law where copies are made for other than private use, a fee is payable to the publisher, the amount of the fee to be determined by agreement with the publisher.

© by Springer-Verlag Berlin Heidelberg 1979
Printed in Germany

Printing and binding: Beltz Offsetdruck, Hemsbach/Bergstr.
2141/3140-543210

Table of Contents

3	Introduction
	Part I Proving the Main Theorem
9	Section 1 Linearly Compact Modules and Almost Maximal Rings
14	Section 2 h -local Domains
23	Section 3 Valuation Rings and Bezout Rings
29	Section 4 Basic Facts About FGC Rings and the Local Case
37	Section 5 Further Facts About FGC Rings and Torch Rings
44	Section 6 The Zariski and Patch Topologies of the Spectrum of a Ring
49	Section 7 The Stone-Cech Compactification of \mathbb{N}
58	Section 8 Relating Topology to the Decomposition of Modules
64	Section 9 The Main Theorem
	Part II Constructing Examples
72	Section 10 Valuations
82	Section 11 Long Power Series Rings
88	Section 12 Maximally Complete Valuation Domains
97	Section 13 Examples of Maximal Valuation Rings
98	Section 14 Examples of Almost Maximal Bezout Domains
108	Section 15 Examples of Torch Rings
110	Bibliography
113	Index of Notation and Definitions