Undergraduate Texts in Mathematics

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L. Christine Kinsey

Topology of Surfaces

With 276 Illustrations

Springer

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Mathematics Subject Classifications (1991): 54-01, 55-01

Library of Congress Cataloging-in-Publication Data
Kinsey, L. Christine.
Topology of surfaces / L. Christine Kinsey.
p. cm. - (Undergraduate texts in mathematics)
Includes bibliographical references and index.
ISBN 978-1-4612-6939-7 ISBN 978-1-4612-0899-0 (eBook)
DOI 10.1007/978-1-4612-0899-0
(Berlin: acid-free)
1. Topology. I. Title. II. Series.
QA611.K47 1993
514-dc20 93-2605
Printed on acid-free paper.

Production managed by Henry Krell; manufacturing supervised by Vincent Scelta.
Photocomposed copy prepared from author's TeX files.

9 8 7 6 5 4 3 2 (Corrected second printing, 1997)

ISBN 978-1-4612-6939-7 SPIN 10540133

To Ray

Preface

"...that famous pedagogical method whereby one begins with the general and proceeds to the particular only after the student is too confused to understand even that anymore."

Michael Spivak

This text was written as an antidote to topology courses such as Spivak describes. It is meant to provide the student with an experience in geometric topology. Traditionally, the only topology an undergraduate might see is point-set topology at a fairly abstract level. The next course the average student would take would be a graduate course in algebraic topology, and such courses are commonly very homological in nature, providing quick access to current research, but not developing any intuition or geometric sense. I have tried in this text to provide the undergraduate with a pragmatic introduction to the field, including a sampling from point-set, geometric, and algebraic topology, and trying not to include anything that the student cannot immediately experience. The exercises are to be considered as an integral part of the text and, ideally, should be addressed when they are met, rather than at the end of a block of material. Many of them are quite easy and are intended to give the student practice working with the definitions and digesting the current topic before proceeding. The appendix provides a brief survey of the group theory needed. The choice of topics addressed is my own, and fairly random at that, and was dictated by the fact that the text is used in a semester course. I often augment the text with articles from the general scientific and undergraduate math journals, which is a gentle way of getting the student to read and discuss mathematics.

This book originated as a set of lecture notes for a course in geometric topology at Vanderbilt University, and later at Canisius College. The present text has been used for a course taught to senior math majors. I have also taught a similar course for sophomores and juniors who have had a course in linear algebra but not in group theory, in which case I covered Chapters 1, 2, 4, 5, 6, 7, and 10.

This text was prepared using the $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX macro package and the

macros supplied by Springer-Verlag New York. Portions of the text were prepared with the support of a Canisius College faculty fellowship. I would like to thank Metod Alif, Terry Bisson, Jim Catalano, Alex Douglas, Richard Escobales, Jim Huard, Mike Mihalik, Ray Mullican, Ian Putnam, John Ratcliffe, Tina Romance, Karl Schroeder, and Marlene Trzaska for many corrections, comments, and suggestions. Any mistakes remain my own.

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