
ADVENTURES IN CELESTIAL MECHANICS

Second Edition

VICTOR G. SZEBEHELY
HANS MARK

Department of Aerospace Engineering
and Engineering Mechanics
The University of Texas at Austin



A Wiley-Interscience Publication

JOHN WILEY & SONS, INC.

New York / Chichester / Weinheim / Brisbane / Singapore / Toronto

CONTENTS

Preface	ix
1 ON THE SHOULDERS OF GIANTS: AN HISTORICAL REVIEW	1
2 CIRCULAR ORBITS	13
3 THE GENERAL PROBLEM OF TWO BODIES	33
4 ELLIPTIC ORBITS	47
5 ROCKETS	65
6 ENERGY RELATIONSHIPS: HYPERBOLIC AND PARABOLIC ORBITS	85
7 KEPLER'S EQUATION AND LAMBERT'S THEOREM	99
8 ORBITAL MANEUVERING OF SPACECRAFT	139
9 ELEMENTS OF SPACECRAFT DYNAMICS	161
10 PLANETARY EXPLORATION	187

11	GENERAL PERTURBATION THEORY AND A SPECIFIC APPLICATION TO THE MOTION OF THE PLANET MERCURY	221
12	THE MOTION OF EARTH-ORBITING SATELLITES	247
13	THE PROBLEM OF THREE BODIES AND THE STABILITY OF THE SOLAR SYSTEM	263
APPENDIX I	GLOSSARY	283
APPENDIX II	PHYSICAL CONSTANTS	291
APPENDIX III	ANNOTATED LIST OF MAJOR REFERENCE BOOKS	295
INDEX		305