CONTENTS

PREFACE

The objectives of the fifth edition are not only to retain the useful portions of Timoshenko's classical work, but also to introduce more modern techniques for ease in computations. As before, we discuss one-degree, two-degree, multiple-degree, and infinite-degree of freedom systems, in that order. The chapter on nonlinear systems is updated and expanded to incorporate more numerical methods that have proven to be effective. Also, a new chapter on the finite-element method for discretized continua has been added at the end of the book. We emphasize matrix and numerical methods wherever feasible and describe computer programs that apply the theory in the text. Flowcharts for the programs appear in Appendix B. These programs are coded in FORTRAN for personal computers and recorded on diskettes for distribution to users. A diskette may be purchased from Paul R. Johnston, 838 Mesa Court, Palo Alto, CA 94306.

Material in this book is intended for engineering students in the last year of their undergraduate program or the first year of graduate studies. They should have a good understanding of calculus, including differential equations. Previous courses in statics, elementary dynamics, and mechanics of materials are also required. Although some exposure to structural analysis and theory of elasticity would be helpful, these subjects are not prerequisites for studying vibration theory. We assume that the student has some knowledge of matrix algebra and computer programming or is prepared to learn the essentials of these topics while using this text. The reader should find the explanations easy to understand, either as a student or practicing engineer.

The sequence of topics in the book has been arranged to draw the user forward from the simple to the complex. Chapter 1, dealing with linear