

Introduction to Dynamics of Rotor-Bearing Systems

This book is written as an introduction to rotor-bearing dynamics for practicing engineers and students who are involved in rotor dynamics and bearing designs. The goal of this book is to provide a step-by-step approach to the understanding of fundamentals of rotor-bearing dynamics. Therefore, the emphasis of this book is on the basic principles, phenomena, modeling, theory, and interpretations of the results. Numerous examples, from a single-degree-of-freedom system to complicated industrial rotating machinery, are employed throughout this book to illustrate these fundamental dynamic behaviors. The concepts in the text are reinforced by parametric studies and numerous illustrative examples and figures.

INTRODUCTION TO DYNAMICS OF ROTOR-BEARING SYSTEMS

Wen Jeng Chen, Edgar M. Gunter

Introduction

- Basic Concepts
- Single-Degree-of-Freedom Systems
- Free and Forced Vibrations
- Free Vibration
- Forced Vibration
- Total Motion

Coordinate Systems and Rotor Motion

- Coordinate Systems
- Steady State Rotor Motion
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- Orbit Simulator

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- Natural Frequencies and Natural Modes
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Rotating Disk Equations and Rigid Rotor Dynamics

- Rigid Disk Equations
- Rigid Rotor Dynamics
- Rigid Disk on Flexible Rotor
- Flexible Disk Equation
- Offset Disk Equation

Shaft Finite Element Equations

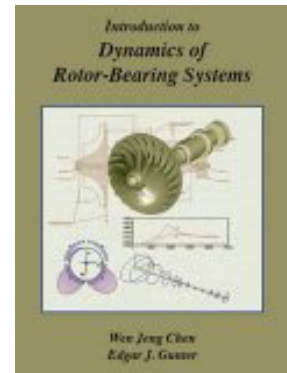
- General Considerations
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- Couplings
- Examples

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- Critical Speeds and Modes
- Whirl Speeds and Stability Analysis
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- Transient Response
- Examples

Torsional Vibration

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