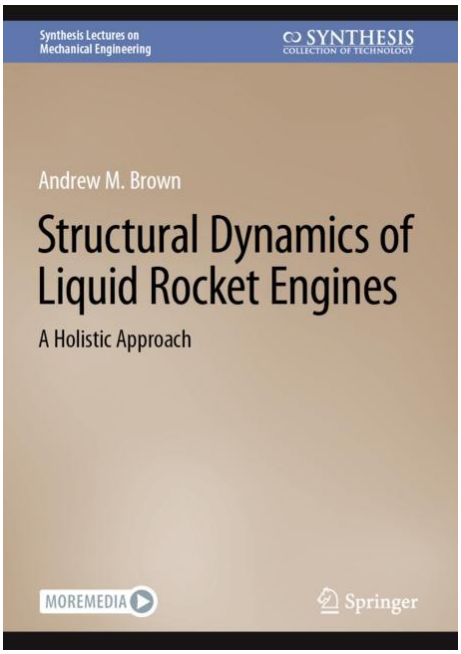

Andrew M. Brown

Structural Dynamics of Liquid Rocket Engines

A Holistic Approach

- First third of the book focuses on the summary of basic concepts in vibrations and structural dynamics
- Presents a brief overview of turbopump operations necessary for SD Analysis
- Discusses specific components with unusual forcing function or structural dynamics characteristics

This is the first Structural Dynamics book focused on this indispensable aspect of liquid rocket engine design. This book begins by reviewing basic concepts in Structural Dynamics, including the free and forced response of SDOF and MDOF systems, along with some discussion of how numerical solutions are generated. The book then moves to a discussion of specific applications of these techniques in LREs, progressing from component level (turbomachinery and combustion devices), up through engine system models, and finally to integration with a launch vehicle. Clarifies specific topics including the Campbell and SAFE Diagrams for resonance identification in turbomachinery, the complications of component analysis in the pump side due to a host of complication factors such as acoustic/structure interaction, the "side-loads" fluid/structure interaction problem in overexpanded rocket nozzles, and competing methods for generation overall engine system interface loads. Includes specific examples for illustration while closing with rotordynamic analysis, dynamic data analysis, and vibroacoustics.

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