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Design and Optimization of Multiple-Frequency Noncollocated Vibration Absorber Using Delayed Feedback

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Abstract:

The proposed dissertation thesis topic constitutes a comprehensive exploration into the design and optimization of a multiple-frequency noncollocated vibration absorber, integrating the delayed feedback control. Traditional absorbers have predominantly concentrated on single-frequency, collocated vibration suppression, often disregarding the intricate dynamics inherent in real-world structures hosting diverse modes of noncollocated vibration. In response, this study pioneers a novel noncollocated absorber adept at simultaneously mitigating vibrations across various frequencies. Noncollocated solutions introduce unparalleled flexibility for effectively suppressing vibrations in remote locations, thereby broadening the practicality of vibration control within scenarios constrained by spatial limitations. Moreover, the research paradigm of this dissertation thesis transcends the conventional view of delay as a limitation, leveraging delayed feedback control to enhance the control performance and magnify adaptability to evolving structural conditions. This paradigm shift empowers the absorber for real-time dynamic optimization, attuning its performance to the dynamic nature of the structure. The doctoral student should endeavor to systematically explore and delineate optimal design parameters for these absorbers, accommodating an array of structural configurations and adapting to varying environmental conditions.

Literature:

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