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Load dependent sensor placement method based on representative least squares

applications in structural health monitoring

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Summary

In the field of sensor placement for structural health monitoring, or traditionally structural dynamics, the reasoning and ideas behind each method is of essential to understand the underlying process of sensor placement. This book focuses on the discussion of existing sensor placement methods, their computation, connections and evaluation criteria. Based on these discussions, a novel load dependent sensor placement method is proposed which can be regarded as an extension to the currently popular Effective Independence method. Furthermore, a mathematical method, namely Representative Least Squares method, is proposed to search for the optimal sensor positions of a structure.

Key features:

- Presents an extensive introduction to sensor placement problems including a mathematical model and its use is structural health monitoring and structural dynamics
- Explores existing methods for assessing their basic assumptions and objectives, in addition to our critical reviews and discussions of their differences and relationship
- Presents a brief survey of current sensor placement evaluation criteria, highlighting the various objectives and their inherent assumptions.
- Proposes a novel load dependent sensor placement method and an associated mathematical method, representative least squares method to solve it.
- Provides a demonstration application of influencing methods on a typical structure with different sensor placement schemes.