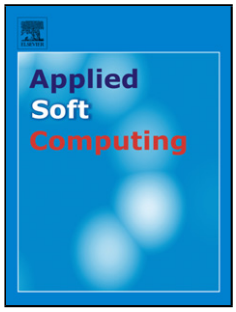

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Damage assessment in truss structures with limited sensors using a two-stage method and model reduction

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Highlights

- A two-stage method using limited modal measurements and noisy data is proposed for damage assessment in truss structures.
- A modal reduction technique is adopted to condense structural physical properties due to limited sensors.
- A newly developed damage indicator is proposed for damage localization.
- TLBO algorithm is utilized and found to be very effective for damage estimation.
- Two numerical examples are conducted to examine the applicability and effectiveness of the proposed method.

Abstract

The paper proposes a practical two-stage approach for damage assessment in truss structures using noisy modal data collected from a limited number of sensors. In the first stage, a newly developed damage indicator, named here as normalized modal strain energy based damage index (nMSEBI), is proposed to locate effectively potential damage elements. In the second stage, the teaching-learning-based optimization (TLBO) algorithm is utilized as a robust optimization solver to determine the damage