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Nondestructive testing and structural health monitoring based on ADAMS and SVM techniques

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ABSTRACT

This paper gives an explanation based on kinetic parameters about the methods of the damage identification of bridge structures in recent years. Material corrosion, structure damage, and bolts loosen are the main factors in suspension bridge collapse accidents. Damage identification of structures is very important in engineering structure safety detection. In system identification procedure to structural damage, modeling error and test error are the main reasons for misjudge. The authors present a structural damage identification method based on numerical simulation and real experiments under lab conditions. PRO-E and ADAMS are adopted to build structure models and do simulation experiments under virtual force; frequency response data are used to build "simulation data sets." In real structure experiments, accelerators and professional signal gathering equipments are used to gather signals of real structure hit by real force so as to build "real data sets." Features are distilled from two data sets, and the authors find numerical simulation model are not always correct as well as real model has its own advantages and disadvantages. Finally, support vector machine (SVM) method was used to do pattern-recognition experiments and show its good performance in structure damage identification.