

The Hong Kong Polytechnic University Department of Applied Mathematics

Seminar on

Finite Element Model Updating in Structural Dynamics-Recent Developments on Computational methods

by

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Abstract

The finite element model updating problem is a special inverse eigenvalue problem for a quadratic matrix pencil and arises in vibration industries in the context of designing automobiles, air and space crafts, and others. The problem is to update a theoretical finite element model using only a few measured data from a real-life structure which was designed based on the theoretical model. The model has to be updated in such a way that the measured eigenvalues and eigenvectors will be incorporated into the model, the symmetry of the original model will be preserved and the eigenvalues and eigenvectors that do not participate in updating will possibly remain unchanged. When the model has been updated this way, the updated model can be used for other future designs with confidence. Despite much research has been done on the problem both by academic and industrial researchers and engineers, the problem has not been satisfactorily solved and an active research is still underway. There are many industrial solutions which are ad hoc in nature and sometimes lack solid mathematical foundations.

In this talk, I shall present a brief overview of the existing techniques and their practical difficulties along with the new developments including several optimization-based methods that have been developed very recently and those which are still under development. The talk will conclude with a few words on future research direction on this topic.

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Time : 3:30 – 4:30 p.m.

Venue : Departmental Conference Room HJ610 The Hong Kong Polytechnic University