Conferencias Plenarias

CP1 Computational and Optimization Methods for the Inverse Eigenvalue Problem in Finite Element Model Updating.

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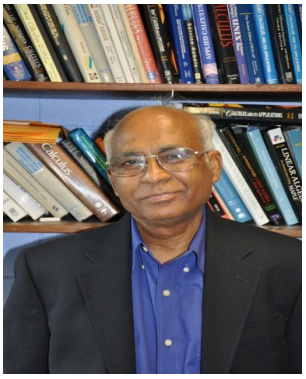
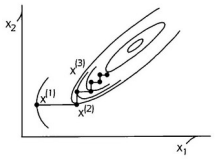


Resumen:
The Finite Element Model Updating concerns updating a finite element generated second-order model of some specified structures in such way that a set of prescribed eigenvalues and eigenvectors are reproduced, the other eigenvalues and eigenvectors remain unchanged and the updated model maintains the same structures as the original model.

The problem routinely arises in vibration industries, such as automobile, aerospace, and spacecraft.
A properly updated model can be used by the engineers with confidence for future designs and manufacturing.

Mathematically, it is a partially prescribed structured quadratic inverse eigenvalue problem.
Since, the problem was formulated in quadratic inverse eigenvalue setting by the speaker in 2001, much research has been done by both mathematicians and engineers, but, unfortunately, the problem still has not satisfactorily been solved. The structure preservation is the most difficult aspect of the problem.

Some notable progress has been made in the last few years by the speaker and his collaborators.
This talk will discuss (i) how the problem arises in industries, (iii) mathematical formulation of the problem in the quadratic inverse eigenvalue setting, (iii) mathematical, computational and engineering challenges, (iv) the progress made so far, and (v) the future research .



The talk is interdisciplinary blending mathematics, scientific computing, optimization with vibration engineering and structural dynamics , and will be of interests to students, researches and practicing engineers in these disciplines.