1057-65-163 **Biswa Nath Datta*** (dattab@math.niu.edu), Department of Mathematics, Northern Illinois University, De Kalb, IL 60115. *Finite Element Model Updating : A Structured Inverse Eigenvalue Problem for Quadratic Matrix Pencil.*

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 very large theoretical finite element model with more than a million degree of freedom using only a few measured data from a real-life structure. The model has to be updated in such a way that the measured eigenvalues and eigenvectors are incorporated into the model, the symmetry of the original model is preserved and the eigenvalues and eigenvectors that do not participate in updating remain unchanged. When the model has been updated this way, the updated model can be used for future design with confidence. Finite Element Model Updating has also useful applications in health monitoring and damage detection in structures, including bridges, buildings, highways, and others.

In this talk, I shall present a brief overview of the existing techniques and their practical difficulties along with the new developments within the last few years. The talk will conclude with a few words on future research direction on this topic. (Received January 20, 2010)