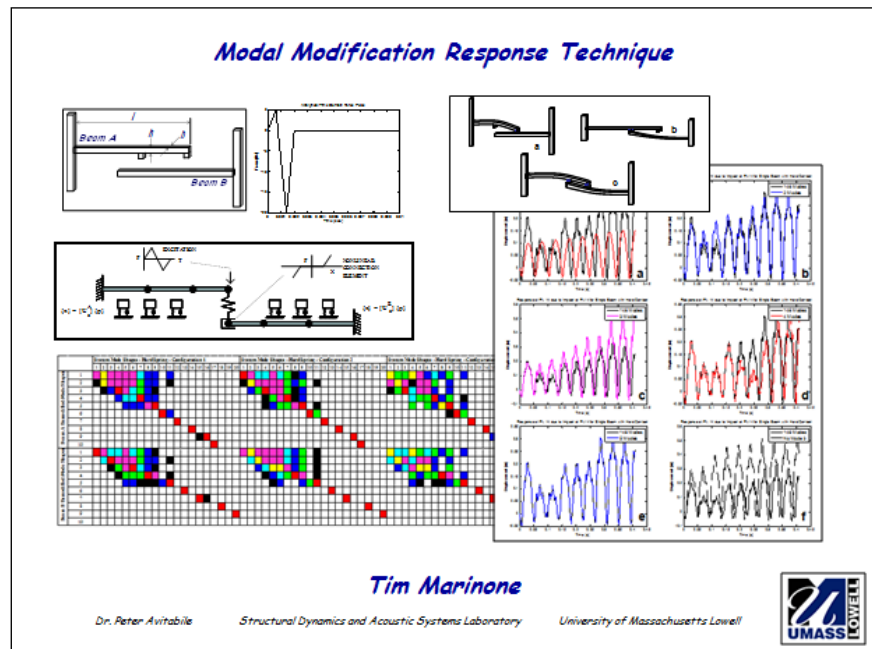_____

### MASTER'S RESEARCH – TIM MARINONE

### MODAL MODIFICATION RESPONSE TECHNIQUE
### DEVELOPMENT FOR NONLNEAR SYSTEM DYNAMIC RESPONSE



Generally, structural systems contain nonlinear characteristics in many cases. These nonlinear systems require significant computational resources for solution of the equations of motion. Much of the model, however, is linear where the nonlinearity results from discrete local elements connecting different components together. Using a component mode synthesis approach, a nonlinear model can be developed by interconnecting these linear components with highly nonlinear connection elements.

The approach presented in this work, the Modal Modification Response Technique (MMRT), is a very efficient technique that has been created to address this specific class of nonlinear problem. By utilizing a Structural Dynamics Modification (SDM) approach in conjunction with mode superposition, a significantly smaller set of matrices are required for use in the direct integration of the equations of motion. The approach will be compared to traditional analytical approaches to make evident the usefulness of the technique for a variety of test cases.

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