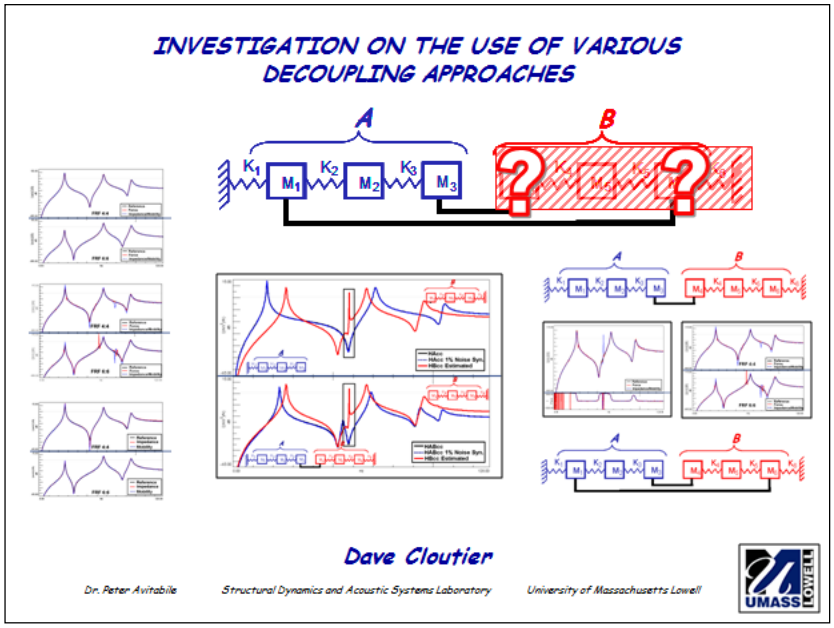
MASTER'S THESIS – DAVE CLOUTIER

INVESTIGATION OF VARIOUS SYSTEM MODEL DECOUPLING TECHNIQUES



Substructuring assembly methods along with component decoupling methodologies allow for detailed assessment of structural systems. Substructure assembly methods have been used for many years and are more thoroughly understood. However, component disassembly techniques are relatively newer and are currently the focus of much research.

Component information is important for the understanding of cascaded system characteristics. Often times a system response needs to be improved through the modification or replacement of one or more component representations. When these individual components are unknown, system decoupling approaches can be implemented to identify component characteristics from system response.

System decoupling can be performed in several ways. Several approaches are considered for the evaluation of component decoupling from the system using frequency response functions. While several techniques currently exist, an alternate technique is presented in this work which decouples using the force required to constrain two components of a system. This technique is compared to the Mobility, Impedance, and Inverse Frequency Based Substructuring and several models are studied to better understand the strengths and weaknesses of each of the techniques. Several issues related to noise, truncation, and rotational DOF are addressed on analytical and experimental structures; however, further work is recommended on revised test structure

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