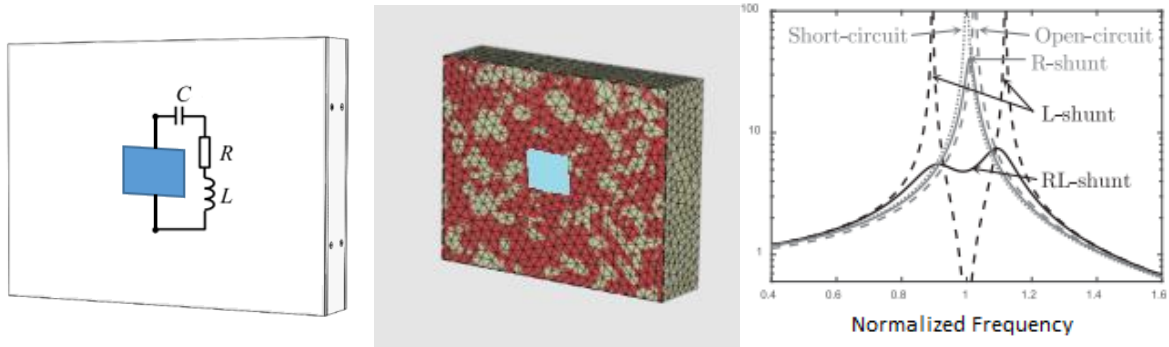


Diplomarbeit

Topic: Utilizing PZT Shunt Circuits for Modifying Vibro-Acoustic Response of Panels



Piezoelectric shunt circuits, which involves connecting piezoelectric transducers embedded within a structure to electrical or electronic circuits, offers a promising alternative for vibration control in small- to medium-sized engineering components. In comparison to Active PZT systems, PZT shunt circuits have advantages for lower power requirements, simplicity and reliability, cost effectiveness and compactness, etc. Although PZT shunt technology has been studied for a couple of decades, its real-world application still demands advancements to enhance its effectiveness and expand its practical usability, especially given common real-world constraints.

By using PZT shunt circuits it is possible to manipulate vibro-acoustic response of the panels. For most of the applications the desired feature is to create electro-mechanical damping on such systems. However, PZT shunt attachment on the panels can create additional modes which can be also used to re-shape the vibro-acoustic response of the structures.

This proposed thesis (Diplomarbeit) will explore the use of PZT shunt circuits to change the modal density of the panels. It will involve vibro-acoustic modeling and prototype measurements of panels with PZT shunt circuit designs, considering various resistors, conductors and inductors.

The following points can be defined as the milestones of the study:

- Performing a literature survey on PZT shunt circuits for vibration and noise control
- Modelling vibro-acoustic behavior of panels embedded PZT shunt circuits with using FEM software
- Parametrically investigating the effect of PZT shunt elements
- Designing PZT shunt circuits for increased mode density
- Validating the prototypes with vibro-acoustic measurements

Supervisor: Dr. Mehmet Sait Özer

Contact: mehmet_sait.oezer@tu-dresden.de, BAR 60

Responsible Professor: Prof. Dr.-Ing. habil. M. Ercan Altinsoy