

## Universität Stuttgart

Institut für Mechanik (Bauwesen) Lehrstuhl für Kontinuumsmechanik Prof. Dr.-Ing. H. Steeb

# Direct and indirect measurements of Poisson's ratio





# Master thesis in cooperation with Anton Paar Germany GmbH

The following master thesis is available at the Chair of Continuum Mechanics of the Institute of Mechanics (Civil Engineering).

small-strain experiments, like In characterization harmonic tests (Dynamic Mechanical Analysis, DMA), high quality measurements of complex Poisson's ratio of isotropic materials are challenging. Two general characterization workflows exists: On the one hand. uni-axial experiments are performed in which axial and transverse strains are measured directly, i.e. locally on the sample. On the other hand, within tension experiments and subsequent torsion tests, the Young's modulus and the shear modulus are determined seperately. From classical relations of isotropic material parameters, complex Poisson's ratio is calculated indirectly.

In close cooperation with Anton Paar Germany GmbH. these two fundamentally different methods shall be evaluated and validated in own experimental DMA tests. Further, it should be determined to what extent the indirect method can be applied to materials with anisotropic mechanical properties, such as 3D printed thermoplastic materials fiberor reinforced polymers.

#### Tasks:

- Sample Preparation
- Performing DMA measurements
- Fourier transformation of harmonic measurements

### **Requirements:**

• Fundamentals of Continuum Mechanics

#### Languages:

German or English

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