Master’s/Bachelor’s Project:

Manufacture and characterization of 3D active rotating particles, VIBROTS

Introduction:

A VIBROT, as the one shown in Fig. 1, is a device capable to convert vibrational energy into rotational energy by means of friction, [1]. Modern manufacturing techniques, such as rapid prototyping using 3D printers, enable us to fabricate more accurate and complex versions of this device, see Fig. 2. The dynamic properties of each vibrot depend on its mass, shape, material, fabrication method, that is why characterization experiments play a key roll after the manufacture process.

Project:

The first part of the project is intended to the design and manufacture of different kind of vibrots, using 3D printers. The parameters to be changed will be mass, length of the legs, inclination of the legs and finally the overall shape of the vibrot (up to your imagination).

The second part of the project is intended to the investigation of the dynamic properties of the manufactured vibrots. Each particle will be placed on a vibrating platform and its whole motion will be recorded with a high speed camera. Further, by applying image processing methods each particle will be tracked and its dynamic properties, such as linear and angular velocity, mean squared displacement, etc., will be determined.

The last part of the project is intended to the optimization of the designed vibrots in order to reveal desired behaviours.

What you will learn:

Modelling and printing in 3D. High speed movie recording techniques. Image processing.

Contact information:

Harol Torres Menéndez
Institute for Multiscale Simulations
Friedrich-Alexander Universität Erlangen-Nürnberg
harol.torres@fau.de

References