

The Institute of Applied Dynamics (LTD) in the Department of Mechanical Engineering is offering at the earliest possible time a

Master's thesis

with the topic

Modeling of a soft robotic gripper using flexible multibody dynamics

Soft robotics show superior performances by mimicking locomotion mechanisms of organisms in nature to achieve smooth, safe and complex motion, such as the soft robotic gripper in Figure 1(a). To actuate soft robots, Dielectric Elastomer Actuators (DEAs) have been applied to serve as artificial muscles. The numerical simulation of the DEA based artificial muscles plays a very important role in the design and optimal control of the soft robotics. To this end, the dielectric elastomer actuated beam model has been developed at LTD as shown in Figure 1(b). This project focuses on extending the DEA beam model to flexible multibody systems, such as a soft robotic gripper.

The thesis involves

- formulating the kinematics of the constrained multibody system connecting fingers (beam) and palm (rigid body) of the gripper
- formulating the dynamics including the contact model between the fingers and the object
- implementing and testing the simulation of the soft robotic gripper in an in-house code

Qualification

- study in Computational Engineering, Mechanical Engineering, Computational Mathematics, ...
- courses in mechanics/dynamics, e.g. Statik und Festigkeitslehre, Mehrkörperdynamik, FEM
- programming experience of time integration method or finite element method in Matlab or C/C++

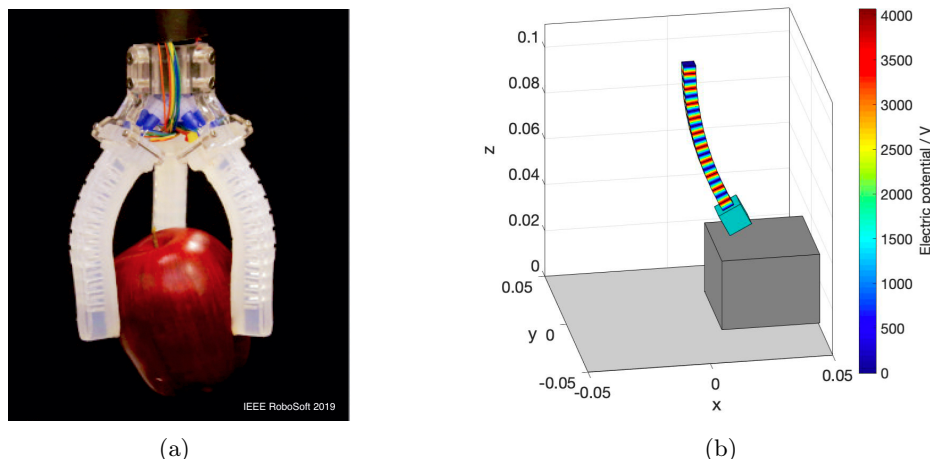


Figure 1: (a) Soft robotic gripper, (b) DEA beam model for soft robotic arm.

If you are interested, please email to dengpeng.huang@fau.de.