

Aufgabenbeschreibung

Bachelorarbeit/Studienarbeit N.N.

Development and construction of an elastic actuator torsional spring for haptic interface

The Institut für Medizingerätetechnik is investigating surgical telerobotics with haptic feedback. Currently, haptic feedback is commonly achieved through the use of elastic actuators. However, these actuators, particularly the torsion spring, are usually relatively large, and heavy, reducing the usability of the device. Therefore, this project is focused on developing a small, simple, and lightweight 3D printed torsional spring which interacts with a hand. The spring should be able to displace a sufficient range of motion so interaction is not felt to be limited, but also be small enough that the elastic actuator response time is not hindered. Therefore, in this regard, the torsional spring should also be designed so minimum design changes are required to increase or decrease the spring constant and thus the torque able to be transmitted. The final prototype will be evaluated using an existing purpose built apparatus.

The main points to be addressed are:

- Investigate an appropriate relationship between the rotational haptic hand interface and the range of torque able to be provided.
- Determine the relationship between the torsion spring constant and other parameters in the elastic actuator, and their influence on elastic actuator performance.
- Identify and evaluate various torsional spring designs in relation to the haptic interface and design constraints.
- Develop and construct a 3D printed torsional spring with a haptic interface.
- Evaluate the prototype with the purpose built apparatus.

Supervision will be provided in English by a native English speaker (From New Zealand). As a result, the thesis should also be written in English.

