Aufgabenbeschreibung

Bachelorarbeit/Studienarbeit N.N.

Development and construction of a test rig to evaluate the performance of a high bandwidth elastic actuator

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 cannot provide high frequency haptic feedback. The institute is currently in the process of creating a high bandwidth elastic actuator, however no setup exists for assessment of performance. Therefore, this project is focused on developing a simple and effective measurement rig which is able to assess the performance of the elastic actuator. In particular, small rotational displacements (0.01 deg) and torques (0.25 Nm) are required to be measured at very high sampling rates (>2.5 kHz). Ideally, the measurement rig can measure a range of torque (0-10 Nm) and be adaptable to various interfaces. The measurement rig should be designed to have minimal influence on the apparatus being tested.

The main points to be addressed are:

- Investigate methods for assessing the rotational displacement at high frequency.
- Investigate methods for accurate assessment of torque.
- Identify and evaluate various measurement rig concepts using eddy brakes, hysteresis brakes, reversed BLDC motors or torsional springs.
- Develop and construct the measurement rig.
- Assess impact of measurement rig kinematics on measurement and develop a method to account for this.

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.