Institut für Medizingerätetechnik

Forschungsarbeit/ Bachelorarbeit

Design and development of a mechanical structure for a 2 DOF Ankle Rehabilitation Robotic System

Rehabilitation after injury or stroke on the lower extremities is often cumbersome and hard to achieve properly. One approach to address this issue is developing an affordable, safe, and cheap treatment solution like a Rehabilitation Robotic system. The Institut für Medizingerätetechnik is investigating a project regarding design and development of a 2 DOF Ankle Rehabilitation Robotic System (ARRS). This is a peer collaborative project, and students can work in groups. This encompasses design and development of both a Mechanical Structure (MS) and an Actuation Unit (AU), aiming on presenting a compatible structure and actuation unit for future development. Students can decide on working on either topic (MS or AU). Accordingly, the structure of the actuation unit must be adaptable with one another.

Figure 2 A model-based ARRS mechanical structure [BA 0197 Fritz]

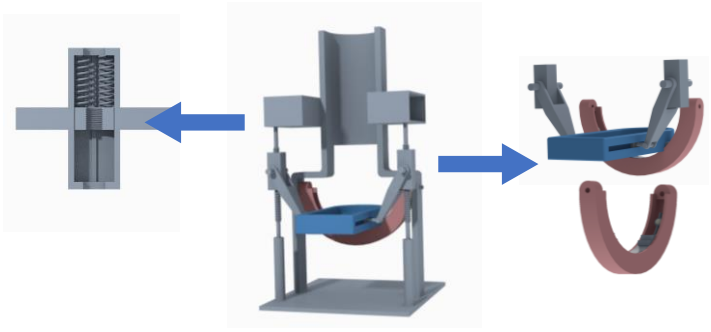

Figure 2 A model-based ARRS actuation unit[BA 0197 Fritz]

Aim of your thesis:

Design and development of the MS

- to design and develop all the mechanical parts (including joints and connections), excluding the actuation unit
- to design and conceptualize the mechanics
- to validate the statics and dynamics of the system using MATLAB

Design and development of the AU

- to model and characterize an actuation unit for ankle rehabilitation
- to design and conceptualize the mechanics and electronics integration.
- to validate the statics and dynamics of the system using MATLAB

The following requirements would be ideal for the prospective students:

- basic knowledge of CAD (Creo Parametric)
- basic knowledge of manufacturing process and mechatronics
- basic knowledge of MATLAB / Ansys

Supervision will be provided in English. Hence, the thesis should be written in English.
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