



Literature research on positioning concepts for the alignment of induction coils in transcutaneous inductive energy transfer systems

Contactless inductive energy transmission in medical technology is not only used for auditory or visual implants, but also has great potential for systems with higher power requirements, such as heart pumps in the range of 5 to 20 W. As the use of batteries is not possible here, these implants are currently supplied with energy via a driveline through the abdominal wall. Here, the use of transcutaneous energy transmission could reduce the risk of infection for patients and improve their quality of life.

The transmission system for a fully implantable ventricular assist device must be designed to be robust and efficient. Thereby, the coil system is of central importance, which at best has a constant coil spacing with precisely aligned coils so that the coupling factor of the system can be kept constant. However, fulfilling this condition is very challenging when using it on the human body. The aim of this thesis is to carry out a detailed literature review on various methods for the precise positioning of induction coils for transcutaneous energy transmission. For this purpose, an overview of different methods is to be created and, the results should be structured in a sensible way. In addition, an evaluation is to be carried out with regard to certain criteria that are important when using inductive energy transfer systems on the human body.

Studenten profile:

- Independent working style and own initiative
- Basic understanding of electrical engineering
- Knowledge in the field of wireless power transfer desirable
- Enjoy literature research and knowledge development
- Talent and interest in structuring complex subject areas

Tasks and time schedule:

- Familiarization with the topic of transcutaneous energy transfer
- Detailed literature research and collection of different positioning methods for the given application
- Classification in the overall context / creation of correlations
- Evaluation according to criteria such as accuracy, component complexity, robustness, ...
- Written elaboration and final presentation

