

Erasmus+ Programme Engineering Internship

Background

Erasmus+ is an EU programme that will provide opportunities for over 4 million Europeans between 2014-2020 to study, train, and gain work experience abroad. One of the programme's many goals is to foster quality improvements and innovation by supporting exchanges, cooperation, and capacity building among institutes of higher education. In this context, an engineering internship is being offered in cooperation with the Chair of Systems Theory and Control Engineering at Saarland University, Germany.

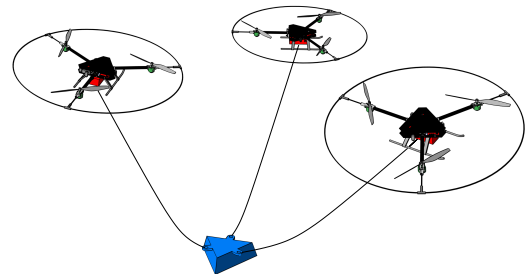


Figure 1: Rendering of multiple LSR Tricopters transporting a cable-slung load.

Timeframe

2 months during June–September 2014 or 2015.

Project topics

The particular research topic will be chosen based on the applicant's interests and capabilities. We are seeking candidates looking to further their existing experience related to any of the following areas:

Multicopter robots: Multicopters have proven to be of great practical and research interest due to their maneuverability yet relative mechanical simplicity. While an individual vehicle has a small payload capacity, the transport of larger loads by the cooperative action of multiple vehicles is proposed. A cable-slung load offers the greatest configuration space for the coordinated system at the expense of complicated body coupling dynamics. We are seeking to solve this challenging problem using distributed parameter system models and by leveraging the experience gained in the development of our in-house designed fleet of quadcopters and tricopters.

Electric machines and power electronics: Large asynchronous machines are used in a variety of industrial applications such as wind power generation. Model-based control techniques of these machines and their accompanying power electronics enable performance improvements over traditional industrial control methods. We are currently experimentally investigating the minimization of overall system losses in a doubly-fed induction generator through optimal distribution of reactive power between machine and converter subsystems.

Requirements

- good English or German communication skills
- strong mathematics, physical systems modeling, or control theory background
- demonstrated competence in C/C++ and/or Matlab

About the research group

The Chair of Systems Theory and Control Engineering is lead by Prof. Dr.-Ing. Joachim Rudolph and includes a small dynamic team of Research Assistants. The group deals with a variety of topics including system modeling and identification, fault diagnosis, and flatness-based control for a wide range of mechatronic systems. Research activities combine theoretical development and practical implementation and are often driven by challenges from industry.

About the University and region

Saarland University is home to about 18,000 students from both Germany and abroad. A variety of sport and social activities are offered on the campus that is located in a green zone just outside Saarbrücken. Saarbrücken is the capital city of Saarland and is situated near the French border. High speed train services make Paris and Frankfurt accessible in less than two hours. Saarland is one of Germany's warmest regions and offers many outdoor activity options including a vast network of hiking and cycling paths.

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