Research Training Group π^3:
Parameter Identification – Analysis, Algorithms, Applications

π^3 is a collaborative project between mathematicians of the Center for Industrial Mathematics (ZeTeM); mathematicians in analysis, topology, and statistics; and applied scientists of the University of Bremen. We invite applications for a

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PhD position (75% of a full position)

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in the area of optimal control and nonlinear optimization in the framework of project R2-6: **Model-Based Parameter Identification and Control in Autonomous Driving Applications**.

Classically, parameter identification is performed strictly a priori to system operation. If parameters of dynamical systems cannot be estimated in static experiments, calibration phases are introduced. However, parameter identification is also required during system operation, e.g. for time-varying parameters that change unpredictably due to environmental influences, or optimal control signals that have to be recomputed online. Providing an adequate, typically nonlinear model of the dynamical system is crucial for control methods such as model-predictive control (MPC), because the system state needs to be predicted in order to optimize future control inputs. Within this project, parameter identification is intertwined with the MPC loop, such that time-varying parameters within the model, e.g. those which depend on wind forces or the current road topology, can be updated. Since MPC is an online optimal control scheme, model accuracy has to be balanced against computational complexity.

We are searching for an enthusiastic and committed researcher with interest in optimization and optimal control as well as in developing and applying new mathematical models and algorithms. Within the research training group, the PhD student will be part of the Optimisation and Optimal Control group at the Center for Industrial Mathematics, working under the supervision of Prof. Christof Büskens.

Requirements:
- M.Sc. or equivalent degree with excellent grades in mathematical sciences or related fields.
- Skills in scientific computer programming.
- Experience in the fields optimal control and optimization is advantageous.
- Industry or research internships are advantageous.
- Fluency in English.
- Desire to work in an international and interdisciplinary team.

The position is for a fixed term of 3 years. The earliest starting date for each position in the research training group is 1 October 2019. The salary is according to the German federal employee scale TV-L E13, 75% of a full position (i.e., approximately € 1700-1900 monthly net income). This call is open until all positions are filled.

Applicants are invited to submit their letter of motivation including a reference to PhD project R2-6, an extended CV including copies of certificates, a publication list (as far as applicable), one recommendation letter from a math professor, and contact information of two more scientists as possible referees.

The recommendation letter should be sent by the math professor directly to us (pi3-application@math.uni-bremen.de), while the application file should only include her/his name and affiliation.

All relevant documents, quoting the official reference number A 297 / 18, should be submitted by May 15, 2019, – preferably electronically as a single PDF file to pi3-application@math.uni-bremen.de – to the π^3-coordination: Dr. Tobias Kluth, Zentrum für Technomathematik, Universität Bremen, Bibliothekstr. 5, 28359 Bremen.

The University of Bremen has received a number of awards for its gender and diversity policies and is particularly aiming to increase the number of female researchers. Gender equality will be given special emphasis within this research training group. Applications from female candidates, international applications and applications of academics with a migrant background are explicitly welcome.

Disabled persons with the same professional and personal qualifications will be given preference.

Further enquiries may be addressed to

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