

Modul InnoLecture: Signal Processing in Biomedicine and Mechatronics					Abk. InnoLecture
Studiensem. 1	Regelstudiensem.	Turnus once	Dauer 1 Semester	SWS 3	ECTS-Punkte 4

Modulverantwortliche/r Prof. Joachim Rudolph

Dozent/inn/en M. Mboup

Zuordnung zum Curriculum Bachelor/Master Mechatronics, Master Comet, Diplom Mechatronik, Bachelor/Diplom Computer und Kommunikation

Zulassungsvoraussetzungen None

Leistungskontrollen / Prüfungen Continuous control based on practical work

Lehrveranstaltungen / SWS Integrated program of lecture course, computer programming, and discussion/documentation

Arbeitsaufwand Course and exercises at the university : 45 h
Homework : 75 h

Modulnote Based on the practical work and oral presentation

Lernziele/Kompetenzen

Learn and become familiar with new algebraic identification and estimation methods
 Team work and oral presentation experience
 Software development experience
 Documentation edition.

Inhalt

Two applications are considered: the neural spike detection (biomedical signal processing) and fault detection and diagnosis (mechatronics). These are approached via a new algebraic identification framework. The objectives of the course are twofold:

- 1) make the students familiar with the new algebraic techniques of identification developed by ALIEN
- 2) software development such as the development of a Matlab/Scilab toolbox, for neural spike detection, along with a comprehensive user guide.

Weitere Informationen:

The course is divided into intermediary objectives, to each being assigned some deliverable for the student. For each intermediary step, the class is divided into groups (2 - 5 students) in competition. At the end of each step, the groups are evaluated and a synthesis of the works of the different groups is made. This serves as the starting point of the next step, with a new set of groups of students

Unterrichtssprache: English

Literaturhinweise:

M. Mboup, *A Volterra filter for neuronal spike detection*, Preprint (2008). Available online at <http://hal.inria.fr/inria-00347048/en/>

M. Fliess, H. Sira-Ramirez, *An algebraic framework for linear identification*, ESAIM Control Optim. Calc. Variat. **9**, pp. 151-168 (2003).