Otto-von-Guericke-Universität Magdeburg
Fakultät für Verfahrens- und Systemtechnik
Institut für Verfahrenstechnik
Lehrstuhl für Mechanische Verfahrenstechnik
www.mvt.ovgu.de

Student assistant in Nonlinear Acoustics and System Analysis

Start date: as soon as possible
Writing BSc/MSc thesis: desirable
Work hours: 30-50 hours per month
Duration: flexible

At the Chair of Mechanical Process Engineering we have extensive research activities in the numerical modelling of multiphase flows, as part of which we also study the complex behaviour of cavitation processes and their applications, and develop novel numerical methods to simulate such processes. A current focus of our work is the acoustic cavitation of microbubbles as they are frequently used in biomedical applications. When microbubbles are excited by focused ultrasound, they exhibit strongly nonlinear dynamic responses, giving rise to high amplitude pressure pulses. A profound understanding of the response regimes is crucial in order to make the associated biomedical applications safer and more efficient.

As part of this work on acoustic cavitation, we are looking for a dedicated student assistant to support us in the area of nonlinear acoustics and system analysis.

Your task: Your work will involve both analytical and numerical aspects. Simulations of the bubble motion will be carried out using an in-house code. Eigenvalue analyses of the fixed points of the governing equations will be carried out to investigate the nature of the equilibrium points of the system. The main body of the project will then involve frequency analysis, the computation of bifurcation diagrams and the inspection of phase planes, if necessary on appropriate Poincaré maps, in order to identify closed orbits and attractors of the system. Your work will help to derive guidelines on the feasibility of different ultrasound excitation frequencies and amplitudes.

What we offer you: You will be part of an enthusiastic group of researchers and you will have the opportunity to gain experience as part of a comprehensive research project on acoustic cavitation. A long-term collaboration is desired and we will provide the opportunity for writing a BSc/MSc thesis based on this project.

Prerequisites:

- Ongoing Bachelor or Master studies at OVGU for an engineering, mathematics or natural sciences degree
- First experience with Linux/UNIX
- Good understanding and knowledge of nonlinear dynamics and system analysis

Desirables:

- Programming experience in C/C++

If you're interested or have further questions please contact

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