

Sound Synthesis from Frequency Domain Data

Project Description

It is a core interest of acoustic engineers to predict and assess the quality of soundscapes, i.e. the acoustic characteristics of the environment. Examples are the interior acoustics of vehicles, such as cars or aircraft, or the room acoustics in concert halls. In order to allow an assessment, the systems under investigation are modelled using mechanical models and the expected sound field (or relevant quantities of the sound field) are computed. Often, such computations are conducted in the frequency domain as the Fourier decomposition facilitates the solving process of the governing equations. The result of a frequency domain computation is a frequency response.

Assessing acoustic systems based on computed frequency responses only can be misleading, since considerable differences in the frequency response may or may not be detectable by a human listener. Therefore, a more concise results could be obtained by means of listening tests with humans for which the computed results serve as stimuli. This way, comprehensive listening tests and more sophisticated analyses, e.g. the computation of psychoacoustic measures are possible and yield more meaningful comparisons than only by comparing frequency responses.

Within this internship, the generation of sound files from frequency domain computations shall be investigated. Therefore, both computations and measurements of generic and aircraft structures shall be conducted and the resulting frequency response functions are converted into a sound file. Moreover, the possibility to generate audible sound files from incomplete data shall be investigated, e.g. when the frequency resolution is coarse or model errors occur. Finally, the quality of the resulting sound file is assessed by means of listening tests. Future works will focus on extending and improving the synthesis process using machine learning techniques but, for instance, are not in the scope of this internship.

Requirements

Applicants should have a sound understanding of acoustics in general and a basic understanding of acoustic measurements / computations. Moreover, a good knowledge in signal processing is required. Knowledge in a high level programming language such as MATLAB or python is necessary. Last but not least, applicants should be willing to and draw a strong motivation from working in interdisciplinary teams.

The entry date is as soon as possible, and the duration of employment is limited to 6 months. The position is part-time with 50% of the regular weekly working time (currently 19,9h). Ongoing applications are possible until all positions are filled. The payment is made according to task assignment and fulfillment of personal requirements to salary group EG 13 TV-L. International applicants may have to successfully complete a visa process before hiring can take place. Candidates with handicaps will be

preferred if equally qualified. Please enclose a proof. The position is part of the SE²A International Female Programme, so only applications by female graduates of non-German universities are possible.

All documents should be in PDF format, preferably in a single file. Personal data and documents relating to the application process will be stored electronically. Please note that application costs cannot be refunded.

Contact information

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