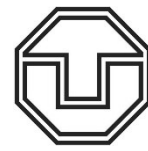


Lecture Invitation



**TECHNISCHE
UNIVERSITÄT
DRESDEN**

SOUND QUALITY OF AUDIO SYSTEMS

MODELING, MEASUREMENT & CONTROL

March 13th -15th 2023 (Technical University Dresden, Germany)

The 2023 lecture on “Sound Quality of Audio Systems” presented by Dr. Wolfgang Klippel, professor at the Institute of Acoustics and Speech Communication, will give you a deep understanding of measurement and diagnostic techniques used in telecommunication, automotive, multi-media, and professional applications to design small, light and cost-effective loudspeakers.

Linear, nonlinear and time-variant systems with lumped and distributed parameters model the generation of signal distortion. The course makes the relationship between symptoms and physical causes of the distortion more transparent. Practical sections will give each participant further opportunities for learning by doing.



HIGHLY RECOMMENDED FOR

- Students and teachers of the electro-acoustics
- Engineers of the audio industry active in research & development, manufacturing, quality control

CONTENT OF THE 3-DAY LECTURE

Benefit from the over 30 years of fundamental research by Dr. Klippel and apply this gained knowledge to your own field of work to improve the way you design and/or manufacture your loudspeaker. The lecture is divided into four topics and will have a special focus on the new IEC standards.

ELECTRO-ACOUSTICAL MODELLING

- Fundamentals - Transduction, vibration, radiation
- Abstraction - Models with lumped and distributed parameters
- Small Signal Performance - Linear approximation and transfer function
- Large-Signal Performance - Thermal dynamics and nonlinearities
- Time-varying properties - Influence of climate and aging

MORE INFORMATION

Date and Time:

13.-15.03.2023 (9 am - 5 pm)

Address:

Dresden University of Technology
Görge-Bau (Room: GÖR 226)
Helmholtzstr. 9
01069 Dresden, Germany

Language:

English

Registration Fee:

400 € (VAT incl.)

free of charge for students and university staff!

Contact:

Contact Jasmin for more information about the agenda and your registration.

Jasmin Klaue

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W: www.klippel.de

MEASUREMENTS AND ANALYSIS

- Persistent excitation - Artificial and natural stimuli
- Monitored signals - Electrical, mechanical, and acoustical sensors
- Complex structures - Digital and analog components
- Sound field - Measurements in the near and far field
- Interaction with the room - Direct and diffuse sound part
- Measurement time - Ultra-fast and long-term (power) testing
- Distortion analysis - Linear and nonlinear components
- System identification - Optimal fitting and parameter estimation
- Transformations - Fourier, wavelet, and perceptual modeling
- Data compression - Separation of unique and redundant information

INTERPRETATION AND DIAGNOSTICS

- Interpretation - Measured symptoms and physical causes
- Perception - Audibility, and impact on perceived sound quality
- Evaluation - Selection of optimal drive units for system design
- Specification - Minimal but comprehensive set of data
- Tolerances – Parameter variations and climate influence

DIGITAL LOUDSPEAKER CONTROL

- Targets – Equalization, linearization, speaker protection, and self-testing
- Mirror filter – Nonlinear structure derived from physical modeling
- Adaptive control – Parameter feedback by using the speaker as a sensor
- Green speaker design – Maximizing efficiency by exploiting nonlinearities and resonances
- Intelligent transducer module – Combining DSP, amplifier, and transducer

NEW TOPICS ADDRESSED THIS YEAR:

- IEC standard 60268-23 for testing large loudspeakers (panels, arrays, TV, monitors,...)
- Rating max SPL according to IEC standard 60268-21
- Testing transducers with small baffles on the KLIPPEL Multi-Scanning Workbench
- Measuring the nonlinear residuum in reproduced music signals

HOUSE-PARTY AT KLIPPEL GMBH

Do not miss our Monday evening party (13th March), starting at 6.00 p.m. in the KLIPPEL headquarter!

- Enjoy finger food, drinks, and live music
- Use this excellent opportunity for further networking & knowledge exchange
- Visit our in-house exhibition & get to know our engineers
- Join the band for a spontaneous jam session (bring your instrument along!)
- Measure your speaker and interpret the results with KLIPPEL experts

Everyone is welcome. No prior sign-up required.

