

Overview Tutorials

Monday + Tuesday (16:00 – 17:00)

General Timetable

	Monday, 11.03.2019	Tuesday, 12.03.2019	Wednesday, 13.03.2019
Sound Quality of Audio Systems	9:00 -10:30	9:00 -10:30	9:00 -10:30
Break	10:30 - 10:45	10:30 - 10:45	10:30 - 10:45
Sound Quality of Audio Systems	10:45 - 12:00	10:45 - 12:00	10:45 - 12:00
Lunch	12:00 - 13:00	12:00 - 13:00	12:00 - 13:00
Sound Quality of Audio Systems	13:00 - 14:30	13:00 - 14:30	13:00 - 14:30
Break	14:30 - 14:45	14:30 - 14:45	14:30 - 14:45
Sound Quality of Audio Systems	14:45 – 16:00	14:45 – 16:00	14:45 – 16:00
Tutorials	16:00 - 17:00	16:00 - 17:00	No Tutorials offered on Wednesday
	1) Hands-on Tutorial Nonlinear Speaker Control Part 1	1) Hands-on Tutorial Nonlinear Speaker Control Part 2	
	or	or	
	2) Did Anyone See the Audio Input? – Handling the Challenges of Wireless and Open-Loop Testing	6) Hassle-free Quality Assurance of Audio Products - Practical Introduction	
	or	or	
	3) Starting with a KLIPPEL R&D System / Performing your first Measurement	7) Audio System Analysis and Auralization	
	or	or	
	4) Acoustical testing in normal rooms	8) Loudspeaker Cone Vibration Analysis: Response, Radiation and Rocking Robustness	
	or	or	
5) Simulating linear response-functions of transducers using Lumped and Boundary Element Method	9) How to measure according to the new Standards IEC 60268-21 (published) & 60268-22 (draft)		

1) Hands-on Tutorial Nonlinear Speaker Control

This tutorial gives an introduction into adaptive loudspeaker control and how it can be used to equalize, stabilize, linearize and protect transducers.

Topics addressed in this tutorial:

- Practical application of nonlinear adaptive loudspeaker control
- Extending the limits of passive loudspeakers by digital signal processing
- Introduction on speaker control with live demonstrations and measurements
- Adaptive Parameter Identification
- Reliable Speaker Protection
- Nonlinear Distortion Compensation
- Stabilization of Voice Coil Position

- Consequences for Transducer and Amplifier Design

2) Did Anyone See the Audio Input? – Handling the Challenges of Wireless and Open-Loop Testing

This tutorial provides practical solutions for testing the acoustic performance of digital, wireless and stand-alone audio devices, such as Bluetooth speakers, wireless headsets or smart speakers

Topics addressed in this tutorial:

- Closed vs open-loop test scenarios
- Wireless and smart speakers, headsets incl. microphones
- Handling Bluetooth audio (interfaces, pairing)
- Synchronizing unknown delays
- Wave-file based testing (stimulus export, response import)
- Triggering open-loop tests
- Error detection
- Addressed KLIPPEL modules
 - R&D Software: TRF, DIS, NFS
 - QC Software: SPL, SYN, EXD

3) Starting with a KLIPPEL R&D System / Performing your first Measurement

This tutorial is dedicated to Klippel greenhorns, although dB-Lab, the Klippel RnD System frame software, welcomes you with a blue background!

Topics addressed in this Tutorial:

- Getting started
- Your first measurements
- Analyzing data, comparing data, post-process data
- Modifying and optimizing measurement settings

4) Acoustical testing in normal rooms

Our anechoic room is always booked! Can I do the measurement in my office?

Topics addressed in this tutorial:

- How to cope with a bad measurement
- How to calibrate a room by a correction curve
- Measurement of Sensitivity (1W@1m) and Distortion (THD)
- How to verify measurement results (self-checks)
- Practical acoustical test with both transducers and systems are performed

5) Simulating linear response-functions of transducers using Lumped and Boundary Element Method

This tutorial will be presented by Jörg Panzer / R&D Team Software Development

This overview demonstrates strategies tackling calculation of response-functions, which are useful for the design of loudspeakers. The software calculates radiation-conditions with the help of the Boundary Element Method, which fully couples to the Lumped Element Part. Hence, the whole system can be simulated from the abstract filter, electronics, mechanic mobility,

one-dimensional waveguides, radiation and the room.

In this tutorial the new software "Akabak" is operated live for a variety of examples.

6) Hassle-free Quality Assurance of Audio Products - Practical Introduction

Topics addressed in this tutorial:

- What belongs to Quality Assurance (QA) of audio products
- What are critical defects and how to detect those
- 100% testing – test speed at physical limits
- As good as needed – find reasonable limits
- Keep it simple – train operators in minutes
- Grow with your needs – modular system with many add-ons

7) Audio System Analysis and Auralization

Something sounds wrong for specific music – how can I get more information?

Topics addressed in this tutorial:

- Practical evaluation of audio system problems using musical excitation on passive and active systems
- Measurement of system states (voltage, current, displacement, sound pressure...)
- Isolation of the Acoustical Symptom for the selected music

8) Loudspeaker Cone Vibration Analysis: Response, Radiation and Rocking Robustness

See a live-demo of the KLIPPEL laser-scanning-vibrometer with modal analysis: Tracing and avoiding cancellation effects, enhancing directivity, improvement of acoustical output and securing robustness against rocking modes.

Topics addressed in this tutorial:

- Animation of cone-vibration over frequency response
- Sound radiation – which parts radiate when at which angle?
- Solving issues with cancellation and directivity
- Studies of vibration energy distribution
- Decomposition of vibration patterns into modes
- Retrieve modal parameters for tuning of finite element models
- Rocking modes: Measure excitation and root-causes (!)
- Addresses KLIPPEL R&D system components:
 - Laser Scanning Vibrometer (SCN)
 - Higher Modal Analysis (HMA)
 - Rocking Mode Analysis (RMA)

9) How to measure according to the new Standards IEC 60268-21 (published) & 60268-22 (draft)

More Information will follow soon!

Please Note: Notification of Tutorial Subscription will be send out to the attendees at the end of February!