CJS Labs

Simulated Free Field Measurements

This presentation introduces simulated free field measurements. A review of linear systems and ideal free field acoustical source behaviour is presented. The free field, far field, and near field are defined as they relate to rooms and acoustical sources – in particular loudspeakers. The measurement goal of minimizing both correlated and uncorrelated noise errors is discussed. Various techniques are presented for performing acoustical measurements without the need for an anechoic chamber. The low frequency room size limitations of both time selective techniques and anechoic measurements are discussed. Techniques enabling measurements of the complex free field response of a loudspeaker to be performed, throughout the entire audio frequency range are presented. The use of this technique for measurements of harmonic distortion is also shown. References for additional detailed information are provided.

Course Outline

- **Linear Systems**
- **Ideal Source Behaviour**
  - **Sound Fields & Source Level vs. Distance**
- **Sound Paths & Noise**
  - **Correlated vs. Uncorrelated Noise Errors**
- **Review of Classic Simulated Free Field Techniques**
  - **Anechoic Room**
  - **Outdoors**
  - **Ground Plane**
  - **Near Field**
- **Time Selective Techniques**
- **Time Window**
  - **Frequency Resolution: The Uncertainty Principle**
- **Full Range Response: Combining Test Techniques**
  - **Overlap Region, Level Offset, and Delay Compensation**
  - **Comparison to Anechoic Chamber**
- **Time Selective Measurements of Harmonic Distortion**
- **Conclusion**

Instructor

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