Speaker Design Tool

The knowledge of the impedance curve of loudspeakers is essential for the calculation and tuning of speaker cabinets. The audio generator Minirator and the audio meter Minilyzer ML1 manage this in the twinkling of an eye.

Test Set-up

All you need is a Minirator (MR2 or MR-PRO) and a Minilyzer ML1 plus an additional resistor R. The resistor value is based on the generator used as follows:

MR-PRO:	1.6 kOhm
MR2:	1.4 kOhm

The Minirator generates a swept sine wave signal with a level of 1.6 V.

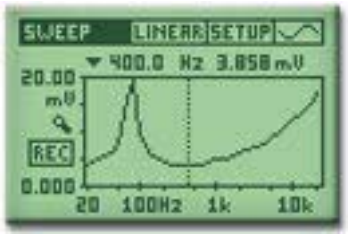
The level measured by the ML1 can be interpreted directly as impedance: 1 mV = 1 Ohm

Remark: This is a linear measurement. The logarithmic level units dBu and dBV are not used for this measurement.

Measurements

Minirator MR2 / MR-PRO

Select the "Sweep" signal with an output level of 1.6 V. At the PARAM - setting of the MR2/MR-PRO select a sweep step duration of "t_step: 1.0 sec".



Minilyzer ML1

After finishing the recording the curve can be zoomed and centred by using the lens symbol. Switch the unit to mV (instead of dBu or dBV). You may read out the exact impedance values by using the cursor (arrow symbol).

Technical Background

Use the frequency sweep function of the ML1 to automatically record the impedance curve (start the recording by pressing the REC button).

To measure the impedance of loudspeakers the output impedance of the Minirator is increased using the external resistor. The output impedance of this configuration is many times higher than the impedance of the speaker. So the Minirator acts like a current source, the current running trough the speaker is constant.

R = U/I -> I = constant --> R is proportional to U.

The output impedance of the MR2 is 200 Ohm, at the MR-PRO 12.5 Ohm. Together with the external resistor R and the output voltage of 1.6 V this forms a current source with a current of 1mA. The outcome of this is the relation: 1 mV = 1 Ohm.

This application is based on an idea of Mr. Barth of Barth Acoustic Systems.

Many thanks!

Thomas Hupp / NTi Audio AG

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