

// DYNLINKWITZ

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HINTERGRUND

Loudspeaker enclosures for low frequency reproduction face the developer with a goal conflict. Either he achieves a small volume enclosure or he achieves a low cutoff frequency. One approach to overcome this shortcoming is the well-known vented enclosure. However, the commonly utilized resonator ports cause other issues, such as flowing noise and delay differences between driver and port. Due to this delay, vented designs suffer from worse phase response compared with sealed enclosures.

PROBLEMSTELLUNG

To achieve deeper bass reproduction sealed enclosures must comprise chassis with high dynamic mass, high compliance, large linear displacement and a strong and heavy magnet. Typical bass chassis for this application are comparably expensive. An alternative is the passively augmented sealed enclosure. In comparison to a non-augmented design, the phase response of this design still suffers some actually unwanted changes.

Siegfried Linkwitz encountered the aforementioned issue with his well known zero point/pole shifting method. Applied to a closed enclosure design the so-called Linkwitz Transformer shifts the cutoff frequency to a considerably lower frequency. In addition, the Linkwitz Transformer maintains the appreciated flat phase response of closed designs. The used chassis, however, massively consumes electric power and must be capable to perform very high displacements. In addition, the original Linkwitz approach yields comparably poor sound pressure levels as well.

Affordable drivers – in particular for consumer products – do not meet the aforementioned requirements. The common Linkwitz transformer most likely will cause mechanical damages due to collisions of the driver coil with the rear pole plate. There strongly remains a demand for an active augmentation suitable for bass drivers commercially available for consumer applications.

LÖSUNG

The DynLinkwitz solution recently developed at Düsseldorf University of Applied



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ENTWICKLUNGSSTAND

Prototyp

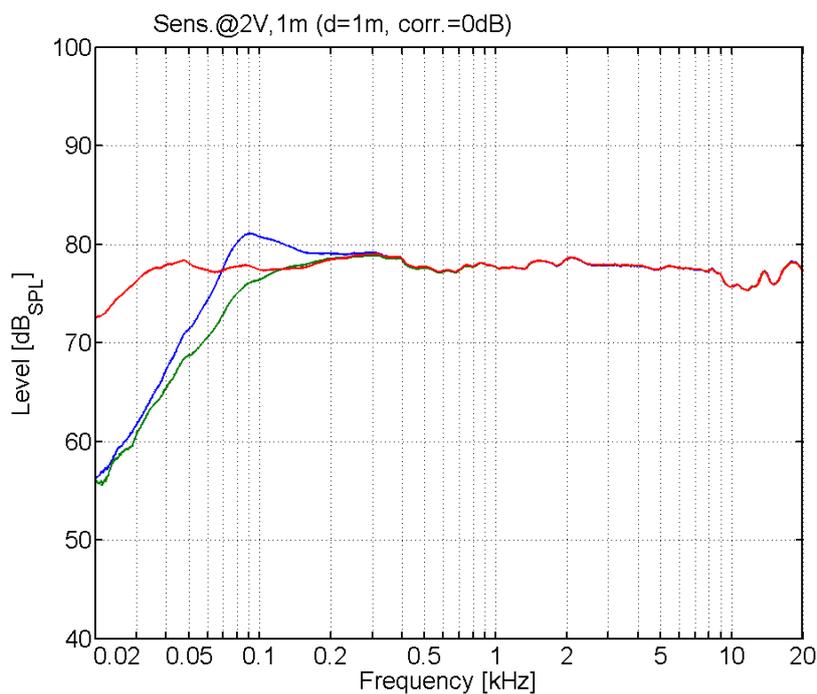
PATENTSITUATION

LU anhängig

CATEGORIES

//Elektronik und
Elektrotechnik //Elektrische
Schaltungen //Informations- und
Kommunikationstechnik

Sciences avoids the shortcomings and maintains the benefits of the commonly known Linkwitz approach: DynLinkwitz considers the properties of the audio input signal and shifts the pair of poles in frequency. With DynLinkwitz, small sealed enclosures achieve deep bass reproduction with smooth roll off and flat phase response without inappropriate loudspeaker diaphragm displacements and excessive power needs.



Frequency response with (red) and without (blue) enhancement

VORTEILE

- Small sealed enclosures
- Low cutoff frequencies
- Smooth roll off
- Flat phase response
- Optimized impulse response
- Well controlled diaphragm displacement

ANWENDUNGSBEREICHE

- Car Audio
 - Home Audio
 - Build in flat screen speakers
 - Miniaturized Bluetooth speakers
 - Smart speakers
 - Smartphones
 - Tablets
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SERVICE

On behalf of Düsseldorf University of Applied Sciences, PROvendis offers access rights to the IP as well as the opportunity for further co-development.
