

Controlled Loudspeaker Inductance $L_e(x)$

By Peter Larsen- LOUDSOFT Ltd

The Voice Coil Inductance is among the non-linear loudspeaker parameters which strongly depends on the Voice Coil position due to the influence of iron in the magnet system.

Inserting a short circuit ring around the pole piece is a known remedy for reducing the Voice Coil inductance. This will be investigated in detail using transformer theory. The inductance versus displacement $L_e(x)$ will be simulated with magnetic FEA software

In addition to a ring or pole cap, more rings and caps in different materials may be added below and above the magnet airgap depending on the coupling with the flux produced by the Voice Coil. In this way the inductance non-linearity $L_e(x)$ can be optimized to be virtually independent of the Voice Coil position.

Examples hereof are given for both normal outside ferrite magnet systems as well as inside neodymium magnet systems.



Peter Larsen, the founder of LOUDSOFT Ltd, has designed loudspeaker drivers and speaker systems since 1974, where he started at VIFA in Denmark.

In 1988 he moved to Dynaudio where the way of designing drivers was totally different from the way they did at VIFA. He then decided to develop a program to help himself in this new task and that program became the start of FINEMotor which later spurred the development of all the design programs in the FINE Suite. These programs have become the preferred tools helping engineers worldwide creating quality loudspeakers in an intuitive way making the development of drivers and speaker systems much easier than ever.

The FINESuspension software is the 3rd Advanced FEA program in the advanced group, which includes FINECone and FINEMotor.

Today LOUDSOFT Ltd. is the worldwide supplier of a full circle of design simulation software, test equipment for R+D, end-of-line testing and consulting.

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