

Popular science summary of the PhD thesis

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Title of the PhD thesis Efficient Audio Systems

PhD school/Department Department of Electrical Engineering

Science summary

This Ph.D. study has focused on efficient energy conversion in audio reproducing systems, e.g. Hi-Fi stereo, Bluetooth speakers etc.. That means research activities in the whole audio chain, from characterization of what music is to efficiency considerations in power supplies, amplifiers and loudspeakers. Key parameters in such systems are size, efficiency and reliability.

Results include a new test signal developed to have same dynamic properties as music but is expressed as a mathematical function. This gives advantages in terms of more application oriented results during test procedures.

Moreover results are new methods for operating audio amplifiers and their power supplies developed to improve thermal issues dramatically in small and power full audio systems thus avoiding need for bulky heatsinks while keeping reliability.

In addition to that the Ph.D. study has provided new methods for designing loudspeakers to improve efficiency thus reducing the overall power requirement from power supply and audio amplifier.

Combined these findings outlines methods to overcome future challenges for audio reproducing systems with respect to size, efficiency and reliability. Therefore the technology presented in this Ph.D. study can be used to shrink the size of audio systems, improve the efficiency when playing actual music, resulting in longer battery life in Bluetooth speakers and lower CO₂ emission in general, and increase reliability all to the benefit of consumers and the society.