Performance of optimized sound field control techniques in simulated and real acoustic environments. Philip Coleman, Marek Olik, Philip Jackson (CVSSP, University of Surrey, Guildford, Surrey GU2 7XH, United Kingdom), Martin Møller, Martin Olsen and Jan Abildgaard Pedersen (Bang & Olufsen a/s, Peter Bangs Vej 15, DK-7600, Struer, Denmark)

It is of interest to create regions of increased and reduced sound pressure ('sound zones') in an enclosure such that different audio programs can be simultaneously delivered over loudspeakers, thus allowing listeners sharing a space to receive independent audio without physical barriers or headphones. Where previous comparisons of sound zoning techniques exist, they have been conducted under favorable acoustic conditions, utilizing simulations based on theoretical transfer functions or anechoic measurements. Outside of these highly specified and controlled environments, real-world factors including reflections, measurement errors, matrix conditioning and practical filter design degrade the realizable performance. This study compares the performance of sound zoning techniques when applied to create two sound zones in simulated and real acoustic environments. In order to compare multiple methods in a common framework without unduly hindering performance, an optimization procedure for each method is first used to select the best loudspeaker positions in terms of robustness, efficiency and the acoustic contrast deliverable to both zones. The characteristics of each control technique are then studied, noting the contrast and the impact of acoustic conditions on performance.