ACOUSTICS2008/1979
A New Sound Field Reproduction Method Based on the Spatial Covariance

Yoshinori Takahashi and Akio Ando
NHK Science & Technical Research Laboratories, 1-10-11 Kinuta, Setagaya-ku, 157-8510 Tokyo, Japan

This work investigates a sound field reproduction method based on the sound field statistics. The covariance among recorded multi-channel signals might represent the relative relationship and the mutual magnitude characteristics between each point in the sound field that time invariant. The author Y. Takahashi et al. proposed a reproduction method minimizing the difference in the spatial covariance between the original and reproduced sound fields [19th ICA, RBA15-012]. We call the method "SOund field Reproduction method based on the sPAtial Covariance (SORPAC)". However it has not been clarified that the theoretical background and the characteristics in listening. The SORPAC doesn't require the information of sound source locations and transfer functions. In this work, we described the reproduction theory of SORPAC in frequency domain. And we showed the relationship between SORPAC and the general wave surface control. Then we confirmed that the SORPAC is able to reproduce the sound source direction without the wave surface control. As a application of SORPAC, we demonstrated a multi-channel contents down-mixing experiment and evaluated the result from the binaural-listening point of view.