Sound field control with a circular double-layer array of loudspeakers

This paper describes a method of generating a controlled sound field for listeners inside a circular array of loudspeakers without disturbing people outside the array appreciably. To achieve this objective, a double-layer array of loudspeakers is used. Several solution methods are suggested, and their performance is examined using computer simulations. Two performance indices are used in this work, (a) the level difference between the average sound energy density in the listening zone and that in the quiet zone (sometimes called "the acoustic contrast"), and (b) a normalized measure of the deviations between the desired and the generated sound field in the listening zone. It is concluded that the best compromise is obtained with a method that combines pure contrast maximization with a pressure matching technique.