

## 11. Active Noise Control Method for Specified Areas

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In environments such as factory production facilities, various factors may not allow the implementation of measures to enclose and isolate noise sources. The research presented here involved developing an active noise control (ANC) system to reduce noise only within specific areas, such as specific workplaces. ANC systems typically require several loudspeakers to reduce noise in a specified area. However, the control sounds from control loudspeakers of ANC systems adopting feedforward-type control method can interfere with each other, amplifying rather than reducing noises.

We developed a feedforward-type control method capable of effectively reducing noise in a specified area. We devised an amplitude adjustment function (monitor control) using a monitor microphone as a method for controlling loudspeaker amplification. The monitor microphone senses interference between the control loudspeakers sounds; based on this, the monitor function adjusts the amplitude of the sounds generated by the control loudspeakers. Our numerical simulations confirmed the stability of the proposed control method. Our experiments demonstrated effects of up to about 20 dB within the target area (W: 1.5 m; D: 1.5 m; H: 1.2 m) and an average figure of 8 dB.

**Key words:** active noise control, specified area, feedforward control, control stability, factory noise, predominant frequency