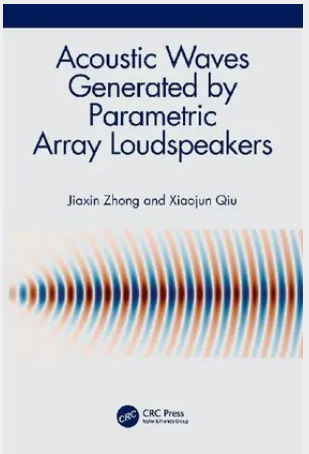
Zhong / Qiu

Acoustic Waves Generated by Parametric Array Loudspeakers



Parametric array loudspeakers (PALs) are capable of generating highly directional audio beams from nonlinear interactions of intense airborne ultrasound waves. This unique capability holds great potential in audio engineering. This book systematically introduces the physical principles of acoustics waves generated by PALs, along with the commonly used and the state-of-the-art numerical models, such as the Westervelt model, the convolution directivity model, the Gaussian beam expansion method, and the spherical wave expansion method. The properties of sound fields generated by PALs are analyzed. Also analyzed are various phenomena including the reflection of acoustics waves generated by PALs from a surface, transmission through a thin partition, scattering by a rigid sphere, and propagation in rooms. Furthermore, the steering and focusing of acoustics waves generated by PALs and potential applications of PALs in active sound control are investigated. Finally, the implementation issues of hardware, signal processing techniques, measurement, and safety are discussed. The book is tailored to meet the needs of researchers in this field, as well as audio practitioners and acoustics engineers.

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