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Study on Discontinuity Properties of Phased-Array Ultrasound Transducer Affecting to Sound Pressure Fields Pattern

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Abstract : The phased-array ultrasound transducer types are utilities for medical ultrasonography as well as optical imaging. However, their discontinuity characteristic limits the applications due to the artifacts contaminated into the reconstructed images. Because of the effects of the ultrasound pressure field pattern to the echo ultrasonic waves as well as the optical modulated signal, the side lobes of the focused ultrasound beam induced by discontinuity of the phased-array ultrasound transducer might the reason of the artifacts. In this paper, a simple method in approach of numerical simulation was used to investigate the limitation of discontinuity of the elements in phased-array ultrasound transducer and their effects to the ultrasound pressure field. Take into account the change of ultrasound pressure field patterns in the conditions of variation of the pitches between elements of the phased-array ultrasound transducer, the appropriated parameters for phased-array ultrasound transducer design were asserted quantitatively.

Keywords : phased-array ultrasound transducer, sound pressure pattern, discontinuous sound field, numerical visualization
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