

ON THE QUESTION OF RADIATION IMPEDANCE OF TWO-SIDED DISK TRANSDUCERS LOCATED NEAR THE ACOUSTIC SCREEN

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The need to expand the operating frequency band for solving problems of underwater objects detection, taking into account the physical basis of constructing electroacoustic transducers and antenna technology, forces us to consider options for using electroacoustic receiving transducers up to the resonance frequency of their mechanical oscillatory systems and performing a tight arrangement of the transducers inside the antenna. When implementing this kind of technical solution, the influence of the interaction of transducers on the antenna's final parameters becomes significant, making it necessary to take this interaction into account when designing the antenna array.

Consideration of the mutual influence of transducers on the field characteristics of the antenna array, in general, occurs by calculating the total mechanical resistance of each transducer, which requires self- and mutual radiation resistances.

In the article, we calculate and analyze the frequency dependence of self- and mutual radiation resistances of two transducers depending on the oscillation mode, the distance between them (for mutual resistance), the distance to the screen, and the type of impedance screen. The calculation results show a significant influence of the element spacing and the type of impedance screen on mutual radiation resistance. It can be concluded that it is necessary to consider the transducers' interaction near the impedance screen when inter-element distance is less than $0.5\lambda \dots 0.6\lambda$ and when operating near the resonance, regardless of the oscillation mode.

Keywords: radiation impedance, acoustic impedance screen.

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