

Scattering of Elastic Waves in the Half-space and Relation between the Lax-Phillips Theory and the Wilcox Theory

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In elastic bodies there are several kinds of the waves. We are interested in one of them, the Rayleigh wave. This wave is concentrated near the boundary with the individual behavior different from the others, and seems to be associated with conditions of the boundaries. By this observation we are motivated to formulate a scattering theory suitable for the Rayleigh wave. In general, scattering theories present the limit states at infinity of time in terms of the equation in the free space which is examined well. We think the half-space is suitable as the free space when taking into account the Rayleigh wave.

Thus we formulate the scattering theory of the Lax-Phillips type in the half-space and give concrete expressions of the fundamental tools (the translation representation, etc.). On the other hand we know another type of the theory, called the Wilcox type. We extract also characteristic points from the both types, and in view of those points we show that the both settings can be translated into each other. This consideration helps us to accomplish our concrete formulation in the half-space. This formulation of the Lax-Phillips type means also the good selection from admitted constructions of the Wilcox type in the abstract arguments. Our formulation will be a basis on investigating scattering inverse problems.

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