PROPERTY OF INTERNAL SYMMETRY OF INTERRELATION BETWEEN PARAMETERS OF OPTIMAL STRUCTURES IN THE PROBLEMS OF OPTIMAL SYNTHESIS OF INHOMOGENEOUS STRUCTURES AT WAVE EFFECT

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"The coming great era of the awakening of the human mind will bring the method of understanding of the qualitative substance of equations. Today we are not yet capable of it".
R. Feinman

During many decades a great attention is being paid to investigation of wave processes in inhomogeneous structures. At wave effect on an inhomogeneous structure a system of reflected and refracted waves is developed. It is possible to control the wave pattern of the process while changing a structure of the inhomogeneous medium. Operation of many devices and equipment in different fields of technology [1 –8] is based on this fact. Inhomogeneous structures are of great importance in controlling the energetics of wave process. They are widely used in optics, radiophysics, quantum electronics, acoustics, thermodinamics . The main problem of studying the wave processes in inhomogeneous structures is that of designing the inhomogeneous structure with the required properties The above problem consists in such a choice of the inhomogeneous medium structure where its energy characteristics are very close to the given relations. The investigator is interested mainly in what limiting possibilities of controlling the wave field parameters can be attained in case when the system consisting of alternating layers with different physical properties is used as a controlling device. Finding of structures, realizing the limiting possibilities, is connected with the exhaustive search on the set of all the admissible variants.As a rule, this set is extremely large. Therefore, even the use of a high-speed computer cannot provide the exhaustive search as well as the solution of the problem of studying the limiting possibilities of inhomogeneous structures to control wave field parameters.

The lack of effective methods of solution of the above problem prevents the effective use of wave converters of energy in different field of physics and technology as well as in new fields of application.

A qualitatively new approach to the solution of the problem in question is suggested. It is connected with the possibility of existence of some internal order or symmetry in the parameters' correlation in structures realizing the limiting possibilities.