

MATHEMATICAL METHODS OF INVESTIGATION LIMIT POSSIBILITIES OF INTERFERENCE COATINGS FOR THE REACHING OF THE GIVEN COMPLEX OF THE PROPERTIES

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It is investigated mathematical basis for the working effective methods of investigation limit possibilities interference coatings of the reaching given complex of the properties.

The problem working interference coating with given complex of the properties is investigated already many years. Importance this problem is connected with wide application of the interference coating indifferent fields physics and techniques. The most general approach to the decision of the problems of optimal synthesis is variational. The quality criteria characterize degree of nearness of the functional characteristics the projecting coatings to the demanded.

The specific speciality of the synthesis problems of the layer structures lead that in this problems essential interest have the separation all variants layer structures, that realize limit possibilities, that is give global minimum quality functional.

The working constructive conditions that allow to differ global minimum from multitude local-optimal is very complex problem. Therefore in present time absent the possibility effective finding of the global minimum.

The decision this problem suppose existence the possibility on the effective general search all admissible variants constructions. However realization general search is impossible even for the quick computers. Known approaches to the decision this problem is connected with review of the part multitude and therefore do not allow finding the variant that realize the limit possibilities.

Effective decision this problem is connected with development modern mathematical apparatus in this direction. Was developed new qualitative approach to the decision of the problems optimal design layer coatings and investigation its limit possibilities. This approach is based on the further development and generalizing principle maximum L.S. Pontrjagin, decision row complex problem, connected with multivariant set. This approach allow without general search all variants constructions to find more effective decisions than by using traditional methods.

Given approach was developed for the decision problems optimal design coatings for wave influences different physical nature (electromagnetic, acoustic, thermal, elastic) [1-41].

It is established, that coatings, that realize limit possibilities, have some specific unical properties their structure. This specific properties differ optimal structure from multitude not optimal variants coatings. This allow to realize effective design of coatings without general search all admissible variants.

Developed approach, to example, allow to realize a priori narrowing set of admissible materials, to realize search of materials, that bringing to essential improvement properties of coatings. If this materials do not in nature, maybe to point properties of materials that necessary to make artificially, that their including in construction is resulted to the essential improvement its properties.

Developed approach allow to realize design layer coatings with properties that limitely near to given.

Literature

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