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Comparative analysis of algorithms for solving inverse problems related to monochromatic monitoring the deposition of multilayer optical coatings. (English. Russian original)

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Summary: The paper presents a comparative analysis of three fundamentally different algorithms for solving inverse problems of monitoring the layer thicknesses of optical coatings based on the data of monochromatic measurements of the reflection/transmission coefficients during deposition process. The previously developed geometric approach to the study of the thickness error correlation of deposited coatings is extended to the case of monochromatic measurements. A new parameter called the self-compensation factor was introduced to estimate the effect of error self-compensation. Its role in assessing the prospects for using various algorithms for coating deposition monitoring is shown.

MSC:

78A46 Inverse problems (including inverse scattering) in optics and electromagnetic theory
78-05 Experimental work for problems pertaining to optics and electromagnetic theory
78A55 Technical applications of optics and electromagnetic theory
78M99 Basic methods for problems in optics and electromagnetic theory

Keywords:

inverse problems; algorithms; optical coatings; monochromatic monitoring; error correlation; error self-compensation

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