Abstracts

Optimization of Multilayer Antireflection Coatings Using an Optimal Control Method

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The design of a thin, light weight and broadband radar absorber is a problem of considerable interest and is cast in this paper as a minimization problem off the following quantities, namely the reflection coefficient at the set of frequencies {f/sub 1/, f/sub 2/, · · ·, f/sub n/} and the thickness (or surface mass) of the absorber. We attempt to synthesize an absorber with a undefined number of layers and assume we have the freedom to choose the permittivity and the permeability of the material in each layer from a set of m specified value of epsilon/sub k/(f) and μ/sub k/(f). The usual approach to the design problem is to consider classical types of absorbers, such as Dallenbach or Jaumann layers. In this paper, we present a design procedure based upon an Optimal Control method, that simultaneously determines both the material properties of the different layers as well as their thicknesses, to mimimize at the same time the reflection coefficient over a prescribed range of frequencies and surface mass or thickness. Illustrative examples of multilayer absorbers synthetized with this method are presented and the results are compared with those designed by using the Simulated Annealing method.

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