

## **NUMERICAL ANALYSIS FOR RADIATIVE CHARACTERISTICS OF SURFACES WITH PERIODIC NANOSTRUCTURE**

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**ABSTRACT.** A numerical method for predicting radiative characteristics of a surface with periodic nanostructure is proposed. This method consists of a finite element method for evaluating the electric field in the near field and of an integral representation for calculating the intensity of the scattered light. The periodic boundary condition considered here is the case where a phase difference in the electromagnetic waves exists at corresponding boundaries. The method enables prediction of the intensity profile of light scattered by a surface with nanostructures, even if the surface is irradiated from an arbitrary direction incident to the surface. The validity of this method was examined for the reflection of light by a plane plate. Further demonstration of the method confirmed that the blue color of a Morpho butterfly is due to periodic nanostructure on the surface of the wings.