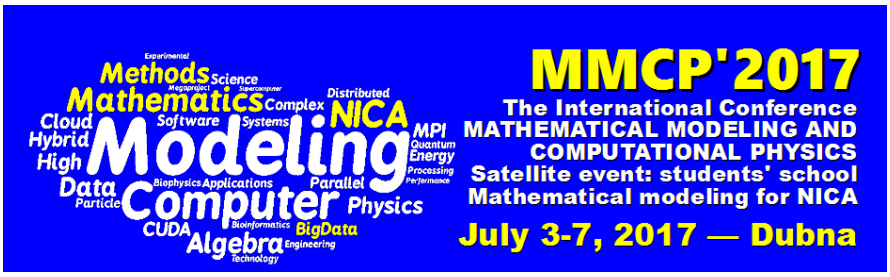

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QUASI-VECTOR MODEL OF PROPAGATION OF POLARIZED LIGHT IN A THIN-FILM WAVEGUIDE LENS

Tuesday 4 July 2017 14:00 (15 minutes)

In [1], a scalar model of the propagation of electromagnetic radiation in a thin-film waveguide lens is described. The applicability of the model to the approximate description of the depolarization process in a thin-film waveguide lens is investigated.
In this paper, based on the ideas underlying the model, we propose an approximate vector model. The proposed model explicitly uses the slow dependence of the Maxwell equations on the transverse horizontal independent variable y and the rapid dependence on the two remaining ones x, z. In Cartesian coordinates related to the geometry of the regular waveguide on which the thin-film waveguide lens is based, taking into account the small parameter of the ratio of slow and fast variables, we obtain a system of zero order equations for TE-polarization:
(1)
and for TM-polarization:
(2)
The systems (1) and (2) are solved by the incomplete Galerkin method in the standard basis
with Maxwell's system of equations in the first approximation takes the form:
(3)
(4)
(5)
(6)
with the known values of and in the right-hand side, calculated in the previous step. The systems (3), (4) and (5), (6) are solved by the incomplete Galerkin method in the basis
of [1]. A boundary value problem of the third kind for equations (3), (4) takes the form:

The boundary value problem for equations (5), (6) has an analogous form.

References
1. Malykh M.D., Divakov D.V., Sevastianov A.L., Sevastianov L.A. Simulation of Polarized Light Propagation in the Thin-FilmWaveguide Lens // Bulletin of PFUR. Series: Mathematics. Information Sciences. Physics. Vol. 25, No. 1. 2017. Pp. 56-68.

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