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Analytical spatial angular structure of polarized radiation fields as an uniform atmospheric slap

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Analytical structure of the polarized radiation fields in a vertically homogeneous plane-parallel planetary atmosphere at any optical thickness has been derived on the basis of generalization of Sobolev′s theory given by the author of present paper jointly with A. S. Anikonov in [1]. Exact formulas for the generalized reflection and transmission polarimetrical functions are given in terms of new spatial/angular structural functions which extended traditional classical representation in [2]-[4]. Rigorous substance of the special Fourier expansion [5] for the Stokes matrix characterizing a radiation field within a homogeneous atmospheric slab (with or without reflecting underlying surface) is given, as well. The phase matrix and the bidirectional reflectance law are assumed to satisfy the property of the known angular symmetry. Basic boundary-value problem and atmospheric linear or non-linear integral equations for the each azimuthal harmonics of Fourier coefficient of the used Stokes matrix are presented. Also, here is given its comparison applied for two approaches: a classical one and a new view on this problem, i.e. when the spatial-angular mirror symmetry of polarized radiation fields is taken into account.

References

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