INTERPRETATION OF REMOTE SENSING DATA WITH Sh-MATRIX METHOD

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Introduction: The *T*-matrix method is widely used for calculations of scattering properties of non-spherical particles [1]. In the *T*-matrix method, the incident and scattered electric fields are expanded in series of vector spherical wave functions, and then a relation between the expansion coefficients of these fields is established by means of a transition matrix (or *T* matrix). *T*-matrix elements depend on the optical and geometrical parameters of the scatterers and do not depend on the illumination/observation geometry, so the *T*-matrix approach allows for the separation of the influence of illumination/observation parameters and inner properties of a scattering object such as its size, shape parameters, and refractive index. Our modification of the *T*-matrix approach (specifically we use here Extended Boundary Condition Method) consists of a further development, namely, we separate the contributions of the different inner parameters of the scattering object [2-5].

Sh-matrix method: We developed a modification of the T-matrix method, which allows us to effectively study scattering properties of particles having irregular shapes. This method allows us to calculate a scattered field in any point of space, and any characteristic of scattered light, that is why this method is very useful. Principal new features: the possibility of calculation of scattering properties of particles without any limitations (such as symmetry axis requirement) on the shape; possibility of analytical averaging of particle scattering properties over ensemble of particles with different sizes and refractive indices. These new features of modified T-matrix method make this method much faster than the analogous methods and call forth that this method seems to be most prospective for investigations in many branches of science, for example, in space studies of the moon, planets, and small bodies of the solar system by remote sensing methods – for investigation of scattering properties of remote objects. This method of scattering calculation allow us to interpret the scattered light data, and basing on this data, to carry out the estimation of information about remote planets, such as sizes and refractive indices of particles ensemble, cover the surfaces of moon, planets, and small bodies of the solar system.

References:

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