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Numerical solution of the some parametric inverse problem of atmospheric optics by Monte Carlo methods

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In the paper parametric inverse problems of atmospheric optics are considered. To solve these problems we applied algorithm "the method of dependent tests for transport theory problems" of Monte Carlo methods. The problems reduced to linear system of equations for parameters and solved by optimizations methods. The numerical solution of the optical depth of the extinction specified. The approximation error is no more than 5-10 percent, which is quite satisfactory for Monte Carlo methods.

Estimation of derivatives of I_k by Monte Carlo methods with respect to parameter τ (is optical depth) to estimate this parameter with the methods mentioned in the proceeding.

This parameter $\tau(\mathbf{r}_n, \mathbf{r}_k, \lambda) = \int \sigma(\mathbf{r}_n + \omega_k l, \lambda) dl$ is called "the optical depth" where $(\omega_k)l = (\frac{(\mathbf{r}_k - \mathbf{r}_n)}{|\mathbf{r}_k - \mathbf{r}_n|})l$ is called "the optical length from $\mathbf{r}_n$ to $\mathbf{r}_k$", ω_k is unit length vector.

Lattices of tringulations of line and their f-vec

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The problem of connections of the structure complexes is discussed. This problem naturally optimization.

Consider a polyhedral cone K, i.e. the set of system of linear inequalities over the field of rati

$$\sum_{j=1}^{d} a_{ij} x_j \geq 0 \qquad (i = 1, \ldots$$

The set $K_I = \{x = (x_1, \ldots, x_d) \in K : \sum$ $I \subseteq \{1, \ldots, m\}$, is called I-face of K. If $K_I \neq I$ face of K. The set of all proper faces is called tl that the set of all faces of K ordered by inclusion $\Gamma(K)$ (with maximal face K).

Let $B = (b_{ik})$ be $(d \times n)$-matrix with co $\Gamma(B(J)) = \Delta(J)$, where $J \subseteq \{1, \ldots, n\}$.

Denote by $B^{\angle} = \left\{\sum_{j=1}^{n} b_j y_j : y_j \geq 0\right\}$ the se binations of its columns and suppose that $B^{\angle}$ is co to system (1). Analogously, let $A_{\angle}$ be the set of nations of rows of A. To determine the structure non-zero elements of matrix $(c_{ij}) = C = AB$. Le if $c_{ij} = 0$ and $\gamma_{ij} = 0$ otherwise. We call a iff there exist matrices $A \in \mathbf{Z}^{m \times d}$ and $B \in \mathbf{Z}$ $k = 0, \ldots, d$ we denote by $\Delta_k = \bigcup_{\tau=1}^{t} \Delta_k(S_\tau)$ th simplicial complex Δ. Assume that $f_k(\Delta) = |\Delta$ and $f(\lambda, \Delta) = 1 + \sum_{k=1}^{d} f_{k-1}(\Delta)\lambda^k$. Represen $f(\lambda, \Delta) = \sum_{k \in \mathbf{Z}_+} \gamma_k(\Delta)\lambda^k(1+\lambda)^{d-k}$. The inte is called (d, n)-*realized* if $\gamma_k = \gamma_k(\Delta)$ for $k = 0, \ldots$

The *triangulation of K with knots from B* is such that S_τ $(\tau = 1, \ldots, t)$ satisfy the following c

1) $S_\tau \subseteq \{1, \ldots, n\}$, 2) $|S_\tau| = r = \operatorname{rank} B(S_\tau)$,

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CERTIFICATE

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