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Let P_e is an empirical measure on the set $V = \{V_i\}_{i=1}^N, V_i \in R^n (R^n$ is a finite-dimensional real vector space). The main task is to construct a of the minimum volume confidence set $D = \bigcup_{i=1}^m El_i(El_i = \{x : (C_i^{-1}(x - m_i), x - m_i) \leq 1\})$, for given m, for which $P_e(x \in D) \geq 1 - \alpha$. The confidence set is used to calculate the optimal portfolio. Since the exact solution of the problem requires a complete enumeration, we propose fast algorithm that finds an acceptable solution. At first the algorithm performs clustering of the elements of the set $V = \bigcup_{i=1}^m W_i, W_i \bigcap W_j = \emptyset$. Then, for each cluster W_i the ellipsoid El_i, of the minimum volume, which contains $k_i = \lceil (1-\alpha)|W_i| \rceil$ of cluster elements W_i, is calculated, $\lceil x \rceil$ is the smallest integer greater or equal than x. The algorithm uses a theorem.

Теорема. Let $w_i^{k_i}$ is a subset of the k_i elements of the cluster W_i and the ellipsoid $(C^{-1}(x-m), x-m) \leq 1$ is the ellipsoid of minimal volume containing a subset $w_i^{k_i}$, let π is permutation of the elements of the set $\{1, 2, ..., |W_i|\}$, for which the implication $i < j \to (C^{-1}(x_{\pi(i)} - m), x_{\pi(i)} - m) \leq (C^{-1}(x_{\pi(j)} - m), x_{\pi(j)} - m)$ is valid, let $\bar{w}_i^{k_i} = \{x_{\pi(i)}, ..., x_{\pi(k_i)}\}$ is ordered subset of cluster elements W_i and the ellipsoid $(\bar{C}^{-1}(x - \bar{m}), x - \bar{m}) \leq 1$ is the ellipsoid of minimal volume, containing a subset $w_i^{k_i}$, then the determinant of the matrix $\bar{C}$ is less or equal than the determinant of the matrix C.