Abstract of the Article
"Improvement of Vogel's Method
in Assignment Tasks"
by L. Malyarets and A. Dobrovolskyi

Vogel's method for finding basic plan close to optimal in assignment problems is examined.

The authors examined the matrix which is the difference between usefulness matrix and matrix that consists of minimum elements of rows or columns of usefulness matrix (in case of minimum problem) or matrix that consists of maximum elements of rows or columns of usefulness matrix (in case of maximum problem) and usefulness matrix.

This research is triggered by the following circumstance: difference elements of the aforementioned matrices contain zeros, at least in quantities equal to the size of usefulness matrix. Application of Vogel's method resulted in basic plan that contained elements of original matrix that correspond (according to allocation place) to these zeroes, perhaps, excluding some of them. It turned out that establishing basic plan that would be close to optimal and even optimal could take less time as the quantity of necessary operation is lower.

Concept of "correct configuration" (CC) of square matrix elements is crucial for non-traditional problem formalization and more economic approach to finding optimum plan: array of matrix elements with potency equal to the size of matrix allocated in different columns.

Non-generalized mathematical model of the problem is the following: at the given usefulness matrix $C = (c_{ij})_{n\times n}$ find CC relative to property $P(c_{ij})$ = "sum of elements of c_{ij} maximizes (minimizes) sum effectiveness of assignments":

given usefulness (efficacy) matrix $C = (c_{ij})_{n\times n}$;

Find CC $\{c_{i\,j_i}\}_1^n = \{c_{1j_1}, c_{2j_2}, ..., c_{n\,jn}\} \,\big|\, P(c_{i\,j})$.

This problem can be solved by finding correct configuration of zeroes (CC-0) with the help of the so called "extinction of zeroes".