The adapted algorithm of Jose A. Diaz for multi-criteria fractional transportation problem with "bottleneck" criterion

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The paper proposes an adapted version of Jose A. Diaz algorithm for solving the multi-criteria fractional transportation problem with the same bottleneck denominators, additionally with the same time "bottleneck" criterion separately. It generates for each (feasible) time value the best compromise multi criteria solution. So, finally, we will obtain one finite set of efficient solutions for solving the multi-criteria fractional transportation problem with the same bottleneck denominators, separately including the time "bottleneck" criterion. The mathematical model of the proposed problem is the follows:

$$\min Z^k = \frac{\sum\limits_{i=1}^{m}\sum\limits_{j=1}^{n} c_{ij}^k x_{ij}}{\max\limits_{ij} t_{ij} \,|x_{ij} > 0\}} \tag{1}$$

$$\min Z^{k+1} = \max_{ij} \ t_{ij} \,|x_{ij} > 0\,\} \tag{2}$$

$$\min Z^{k+1} = \max_{ij} \ t_{ij} \,|x_{ij} > 0\,\} \tag{3}$$

$$\sum_{j=1}^{n} x_{ij} = a_i,\ i = 1, 2, \ldots, m; \quad \sum_{i=1}^{n} x_{ij} = a_i, j = 1, 2, \ldots, n; \tag{4}$$

$$x_{ij} \geq 0,\ i = 1, 2, \ldots, m,\ j = 1, 2, \ldots, n,\ k = 1, 2, \ldots, r. \tag{5}$$

In order to solve the model (1)-(4) we proposed an iterative algorithm, inspired of Jose A. Diaz algorithm [1]. It generates for every time possible value the corresponding " best compromise solution " of the first k criteria [2]. The algorithm was tested on several examples and was found to be quite effective.

Bibliography

[1] Jose A. Diaz, Solving multiobjective transportation problems, Econ-math overview, 15, pp. 62-73, 1979.

[2] A. I. Tkacenko, *Multiple Criteria Fuzzy Cost Transportation Model of SBottleneck T type,* Journal of Economic Computation and Economic Cybernetics Studies and Research, ISI Thomson Reuter Serv., V.48, No.2, 2014, Bucuresti, Romania, pp. 215-232.