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Kantorovich-Rubinstein distance minimization: application to location problems. (English)

Zbl 1442.90119

Velásquez-Bermúdez, Jesús M. (ed.) et al., Large scale optimization in supply chains and smart manufacturing. Theory and applications. Cham: Springer. Springer Optim. Appl. 149, 59-68 (2019).

Summary: The paper considers optimization algorithms for location planning, which specifies positions of facilities providing demanded services. Examples of facilities include hospitals, restaurants, ambulances, retail and grocery stores, schools, and fire stations. We reduced the initial problem to approximation of a discrete distribution with a large number of atoms by some other discrete distribution with a smaller number of atoms. The approximation is done by minimizing the Kantorovich-Rubinstein distance between distributions. Positions and probabilities of atoms of the approximating distribution are optimized. The algorithm solves a sequence of optimization problems reducing the distance between distributions. We conducted a case study using Portfolio Safeguard (PSG) optimization package in MATLAB environment. For the entire collection see [Zbl 1427.90005].

MSC:

90B80 Discrete location and assignment

Software:

Matlab; Portfolio Safeguard; PSG

Full Text: DOI

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