EFFICIENCY FOR CONTINUOUS FACILITY LOCATION PROBLEMS WITH ATTRACTION AND REPULSION

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The talk deals with the problem of locating new facilities in pres- ence of attracting and repulsive demand points in a continuous location space. When an arbitrary norm is used to measure distances and with closed convex constraints, we develop necessary conditions of efficiency. In the unconstrained case and if the norm derives from a scalar product, we completely characterize strict and weak efficiency and prove that the efficient set coincides with the strictly efficient set and/or coincides with the weakly efficient set. When the convex hulls of the attracting and repulsive demand points do not meet, we show that the three sets coincide with a closed convex set for which we give a complete geometrical description. We establish that the convex hulls of the attracting and repulsive demand points overlap iff the weakly efficient set is the whole space and a similar result holds for the efficient set when we replace the convex hulls by their relative interiors. We also provide a procedure which computes, in the plane and with a finite number of demand points, the efficient sets in polynomial time. Concerning constrained efficiency, we show that the process of pro jecting unconstrained weakly efficient points on the feasible set provides constrained weakly efficient points.

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