

## CAPACITATED CLUSTERING OPTIMIZATION MODELS

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### RESUMO

This work shows a set of models for the Capacitated Clustering Problem. The general problem here discussed consider a given number of items with attributes (coordinates in Euclidean space and weight), where one wishes to design minimum dissimilar clusters constrained to a given maximum capacity for each cluster. The groups are designed to achieve a specific objective.

The models consider a new generalized version of the capacitated  $p$ -median problem (CpMP) where it is extracted the median from the set of items. A new linear-binary formulation is introduced for the min-max diameter capacitated clustering problem (MMDCCP) and a new formulation for the heterogeneous capacitated centred clustering (HCCCP) is proposed. For each formulation we consider the aspects and relevance of solving the problems and its inherent complexity and possibility to solve instances of different magnitudes as the number of items increases and/or the number of groups.

We also discuss ways to obtain the best results from the formulations using adequate solvers for each problem, and the major difficulties the solvers could have in running such models. Finally we show that the best way to solve the capacitated clustering problems is by using the HCCCP formulation which surprisingly obtain better upper-bounds for the other two formulations.

**PALAVRAS CHAVES.** Clustering Problems, Modelling, Solvers.

**Área Principal:** PM