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Bregman Circumcenters

In this talk, we first characterize backward and forward Bregman projections onto affine subspaces. Then we introduce backward and forward Bregman (pseudo-)circumcenter operators associated with finite sets. We also demonstrate the existence of backward and forward Bregman (pseudo-)circumcenters of finite sets and show explicit formulae for the unique backward and forward Bregman pseudo-circumcenters of finite sets. Moreover, we state some dual expressions of the backward and forward Bregman (pseudo-)circumcenters of finite sets. Various examples are presented to illustrate the backward and forward Bregman (pseudo-)circumcenters of finite sets. In particular, one example illuminates the existence of the backward Bregman pseudo-circumcenter, while the traditional circumcenter under the Euclidean distance does not exist.