MATEMATISKA INSTITUTIONEN
STOCKHOLMS UNIVERSITET
Avd. Matematik

SJÄLVSTÄNDIGT ARBETE I MATEMATIK

Onsdagen den 3 november kl. 10.00–11.00 presenterar Kristoffer Vinell sitt arbete "Unconstrained Particle Swarm Optimizer for Variable Weighting in Soft Projected Clustering of High-Dimensional Data" (30 högskolepoäng, avancerad nivå).

Handledare: Yishao Zhou

Plats: Sal 31 **(obs!)**, hus 5, Kräftriket

Abstract: Due to the increasing volumes of stored data arising in various fields of business and research, the demand for efficient data analysis tools have skyrocketed in recent years. A popular approach well-suited for tackling high-dimensional data in particular is soft projected clustering, which aims at partitioning the data objects into disjoint subsets. Soft projected clustering is particularly interesting from a mathematical viewpoint, since the clustering process is cast in the form of a nonlinear optimization problem. However, most existing algorithms involve a large number of bound and equality constraints, which severely restrict the performance of the optimization method employed.
In this thesis, a new soft projected clustering algorithm called UPSOVW is developed to overcome these issues. It uses an objective function that enables an unconstrained search procedure by eliminating redundant bound constraints, and employs a particle swarm optimizer in quest for a global optimum. We formally prove that the bound constraints can be omitted without loss of generality, and conduct a stability analysis that provides guidelines for suitable parameter settings in the algorithm. Finally, we compare UPSOVW to an existing algorithm on a number of synthetic high-dimensional data sets.

Alla intresserade är välkomna!