Multiple circle detection by means of center-based clustering
(Detekcija više kružnica pomoću grupiranja podataka na osnovi središta)

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Abstract. The multiple circle detection problem on the basis of given data point set in a plane is considered. It has been supposed that all data points come from k circles that should be detected or fitted. The problem is being solved by the application of center-based clustering of the data set, where clusters are determined by corresponding circle-centers. Thereby, an adaptation of the well known k-means algorithm has been constructed – k closest circles algorithm. Different distances from a point to the circle can be used (e.g. algebraic distance, orthogonal distance, least squares).

In addition, the incremental algorithm for searching of an approximate globally optimal k-partition is proposed. Since optimal partitions with $2, 3, \ldots$ clusters are determined successively in the algorithm, a few well-known indexes for determining appropriate number of clusters in a partition are adopted for this case. Thereby the Hausdorff distance between two circles is adopted and used. The proposed algorithm is illustrated on several numerical examples.