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**Cluster stability in a partition and applications**

**Abstract.** The problem of cluster stability in a partition is considered in this paper. A characterization of a well-separated partition is given and an operational criterion is provided that gives the possibility to measure the quality of cluster separability in a partition. The paper also gives an application to a definition of a new separation index for estimation of the right number of clusters in a partition. In comparison with some other known separation indexes, this index showed its superiority. Several illustrative examples are mentioned as well.

**Key words:** clustering; data mining; cluster stability; stability balls; number of clusters; separation index

**MSC2010:** 62H30, 68T10, 90C26, 90C27, 91C20, 47N10

*The paper was prepared in collaboration with: R.Scitovski and I.Vazler*