

Clustering of the points lying on monotonous curves as a partition into antichains

Lerner E., Voloskov D.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. Let us consider some set of points on the Cartesian plane. Each point is a part of one of few curves describing the dependency between abscissas and ordinates. In our case these are dependencies between the rock occurrence depth and the oil saturation described by Skelt-Harrison equation. In this work a problem of distributing these points into clusters corresponding to different curves is being investigated. Our original method based on presenting data points as elements of partial ordered sets with coordinate order is proposed. Thus to solve clustering problem one needs to find all the points which are parts of maximum length chains and to distribute them into corresponding antichains. One can propose obvious algorithm to solve the problem in quadratic time, based on Mirsky's theorem. In this work algorithm of $O(n \log n)$ complexity is proposed. The algorithm is based on the fact that Dushnik-Miller dimension of the partially ordered set is equal to 2 and can be applied to a wide class of dependencies.

<http://dx.doi.org/10.1088/1742-6596/633/1/012066>
