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Search for and investigation of new open clusters using the data from huge astronomical catalogues

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Abstract. We describe the methods of searching for new open clusters and determining their parameters. We have developed a new method of effectively searching star catalogues (like 2MASS, SDSS, DENIS etc.) for stellar clusters of different radii. This task is rather complicated, and we do not know any successful attempts to automate such procedure applied for the search of open clusters. Our method employs a technique of detection using the convolution with density functions. Also, we have developed a rather robust method, which can be used to determine whether an observed density peak is just an occasional overdensity of field stars, or this is a real group of evolutionary-related (lying on one isochrone) stars. That method is capable of simultaneous finding the position of the isochrone of the cluster and is mainly based on the fact that in real clusters, only stars lying on the isochrone show a density peak, whereas the field stars should demonstrate flat distribution. This fact allows us to find the position of the isochrone of the cluster even when the CMD is "noised" by field stars. So we can automatically find out prospective candidate for clusters, confirm them, and determine main parameters (age, radius, distance and color excess) of these clusters. The poster describes the methods which were used to discover and investigate the large set of open clusters in the Galactic anticenter (Glushkova, Koposov, this conference).

Key words. Galaxy: open clusters and associations: general – Galaxy: structure – Surveys – Methods: data analysis

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