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New algorithm for faint traces detection on CCD images of 'all-sky' cameras

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Abstract

A new algorithm for automatic detection of faint and discontinuous traces is presented.

CCD image is decomposed in a mosaic of square zones (tilts). This way the checking of the process is simple and can be applied to different image zones.

Algorithm includes the following steps, applied to each tilt:

- Getting of 'limit' signal value, between 'active' and non significant signal points. Zones with active points more frequent than a given number is considered as 'saturated' and eliminated (all points are set to zero).

- A new 'limit' signal is obtained and isolated active points are eliminated.

- Each tilt is divided in N by N small zones and active points in each zone are counted. Zones are ordered and selected those N with more active points. Points of other zones are set to zero.

- A strait line is 'fitted' to active points in the tilt. Points far from the line are eliminated.

Algorithm applies the following steps to detected traces:

- Strait lines of tilts are analyzed searching for connectivity. When several lines are connected, middle and external segments are search for.

After traces detection, an estimation of trace magnitude can be obtained by 'reading' signals in the detected trace and its adjacent zones:

- Total signal of new traces and signal per length unit is obtained.

-From stars signal, signal per length unit is obtained.

- From these values, an estimation of trace magnitude can be got.

In any case, the efficiency of algorithm should be checked by personal inspection of the CCD image and its comparison with algorithm results.