Motivation

- Find a different way than F factor to determine at which point does the meteor release the most of its energy.
- Find potential difference between meteors with high and low radiant elevation.

Method

- Extending the number of frames using the method of interpolation.
- Smoothing curves using a method of moving average for every three dots, while maintaining the area below the light curve constant in hopes of conserving the energy.

Formulas used:

\[
F_{\Delta M} = \frac{H_{B\Delta M} - H_{MAX}}{H_{E\Delta M}}
\]

\[
T = \frac{H_T - H_B}{H_E - H_B} = \frac{1}{A} \sum H_i \cdot A_i
\]

Main Problems

- Problem of making a curve smooth without losing a lot of information within it, eg. moving the point of the maximum and so changing its value. This was especially a problem for short meteors with small amount of data.
- Problems with limited sensitivity of the camera. We are able to see only a part of the light curve and determine the F factor for that part.

Results

We used meteors from three different stations in: Padina (SRB), Debelo Brdo (SRB), Maruska (CZ), ValMez (CZ) and tested for four showers: Perseids, Geminids, Orionids and Quadratids. The number of samples exceeded 300 for each shower, except Quadratids. The results are as follows:

<table>
<thead>
<tr>
<th>Shower</th>
<th>F factor</th>
<th>T factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per</td>
<td>0.515474</td>
<td>0.565733</td>
</tr>
<tr>
<td>Gem</td>
<td>0.500947</td>
<td>0.542910</td>
</tr>
<tr>
<td>Ori</td>
<td>0.542321</td>
<td>0.545909</td>
</tr>
<tr>
<td>Qua</td>
<td>0.502347</td>
<td>0.514864</td>
</tr>
</tbody>
</table>

Table 1: Table comparison of F and T for different meteor showers

Conclusions

- Orionids tend to stand out regardless of which method we use to process the data.
- Contradictory to the expectations and regardless of the sample size, Geminids have the lowest F factor and one of lowest T factor of all meteor showers.
- For all showers, meteors with smaller radiant zenith distances, or radiants that are higher up, have bigger F factors than those who are not as high.
- Results didn’t vary on sample size.

Forthcoming Research

If possible, we would like to test these result for television meteors with much higher sensitivity and see the difference.

References


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