Structure of the Lyrid meteor shower from video observations

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The April Lyrids are a regular meteor shower, mostly of a weak activity, observed between April 14–26. The shower maximum appears on April 21–22 with a visual zenithal hourly rate of 5–10 meteors. However, ocassionaly an enhanced increase of the activity exceeding 100 meteors is observed.

The Lyrid stream is associated wih comet C/1861 G1 Thatcher. Its orbit is almost perpendicular to ecliptic, with the revolution period of 415 years.

Two very distinct groups of orbits, short-period and long-period part, in the Lyrid meteor stream can be recognized [1,2]. The groups were probably formed under gravitational influences of two dominant bodies, Jupiter and Saturn.

In [3] and [4], a more complex structure of short-period part of Lyrids is recognized. The semimajor axis distribution shows noticeable groupings near mean resonances with Jupiter, Saturn and Uranus (J: 2/1, 2/3, 2/5, S: 4/3, S1/1, U: 2/1).

In order to verify possible resonance structures, a more detailed analysis and separation of the Lyrid meteoroid orbits based on EDMOND video network database comprising almost one thousand Lyrid orbits, is performed.

For selection and investigation of a narrower set of best defined Lyrid orbits the Welch's method [5] with different threshold values is applied. The results are confronted and verified by a comparison with those obtained from other databases.

Dynamical ways of possible resonance structures are investigated by following the orbital evolution of test particles released from the parent comet at its perihelion passages in its last hundred returns to the Sun.

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