A preliminary numerical model of the Geminid meteoroid stream

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Several years ago, the final version of the qualitative model of the Geminid meteoroid stream was published [1, 2]. This model explained most of the Geminid's structural features, including the bimodality, but to find the quantitative spatial density distribution of particles, we need a more precise model. The first runs of the numerical model have been made, and some preliminary results have been obtained. In an early publication [3], using these results, it was found that a structure introduced into the Geminid stream by the ejection process will survive to be observable today (in contrast to, e.g., the Quadrantid stream). The shower activity curve is the main structural feature which is considered now. In the qualitative model the stream was dislocated, because, to calculate the evolution, a nested polynomials based on a Gauss-type method were used, allowing only secular perturbations of the first order. As it turned out in the new model, the activity curve was also shifted relative to the observed shower. Possible reasons are discussed. A natural dispersion of the stream for three meteoroid masses was evaluated.

References: [1] Ryabova, G.O. (2007) MNRAS, 375, 1371–1380. [2] Ryabova, G.O. (2008) EMP, 102, 95–102. [3] Williams I.P., Ryabova G.O. (2011) MNRAS, 415, 3914–3920.