

POSSIBLE ORBITAL EVOLUTION OF THE COMET C/2017K2 (PANSTARRS). Ireneusz Włodarczyk, Chorzow Astronomical Observatory, e-mail: astrobit@ka.onet.pl.

Introduction: We present computations of possible orbital evolution of the comet C/2017 K2 (PANSTARRS) based on all published observations.

Computation method and results: We based the computation on the published 7385 optical observations over intervals:

2013 May 12.587567 – 2021 Dec. 28.72204:
<https://minorplanetcenter.net/iau/mpc.html>.

Table 1. Starting nominal cometary elements of comet C/2017 K2 (Panstarrs) for error model ‘fcct14’ – upper, and ‘vftc17’ – bottom lines.

Epoch: MJD59005 (2020-June-05.0) TDB.

$q = (1.799536353 \pm 2.408E-06)$ au
 $(1.799537206 \pm 2.761E-06)$ au

$e = 1.0004132510 \pm 6.743E-07$

$1.0004147324 \pm 7.807E-07$

$i = (87.542771228 \pm 5.219E-06)$ deg
 $(87.542792873 \pm 5.747E-06)$ deg

$\text{node} = (88.26625384 \pm 1.359E-05)$ deg
 $(88.26623106 \pm 1.482E-05)$ deg

$\text{peric.} = (236.16061413 \pm 6.428E-05)$ deg
 $(236.16051857 \pm 7.474E-05)$ deg

$T = 2459933.4860330 \pm 3.412E-04$ JDT
 $2459933.4851012 \pm 3.677E-04$ JDT

RMS=0.5762"/ 0.5009"

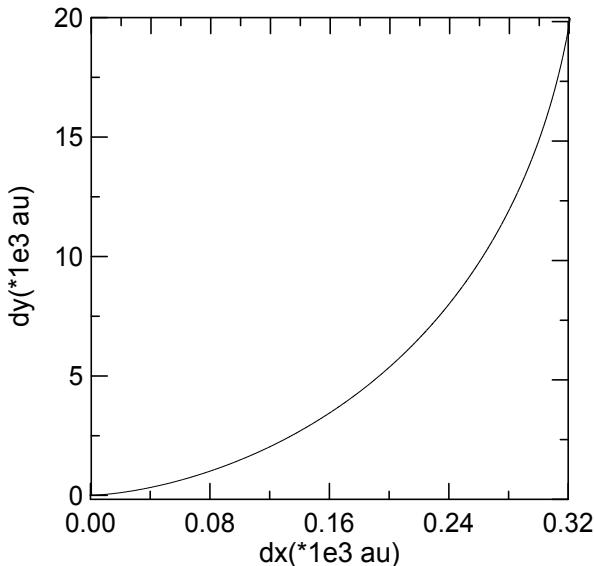


Fig. 1. Differences between the heliocentric rectangular coordinates x and y , in 900 years forward integration using the error models 'fcct14' and 'vftc17'.

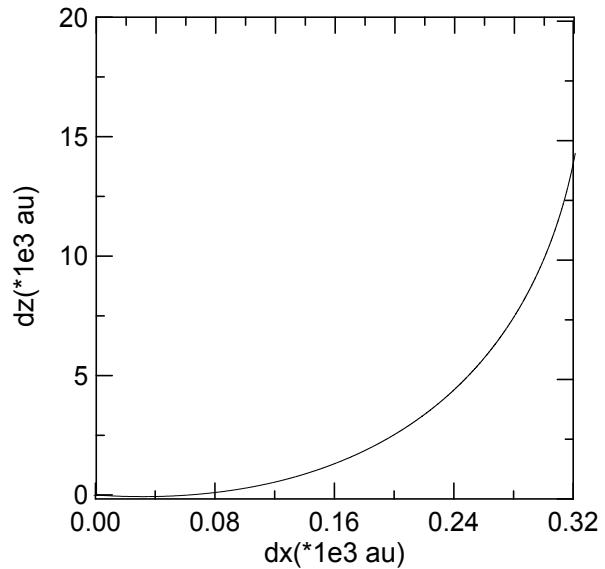


Fig. 2. The same as in Fig. 1 but between x , z coordinates.

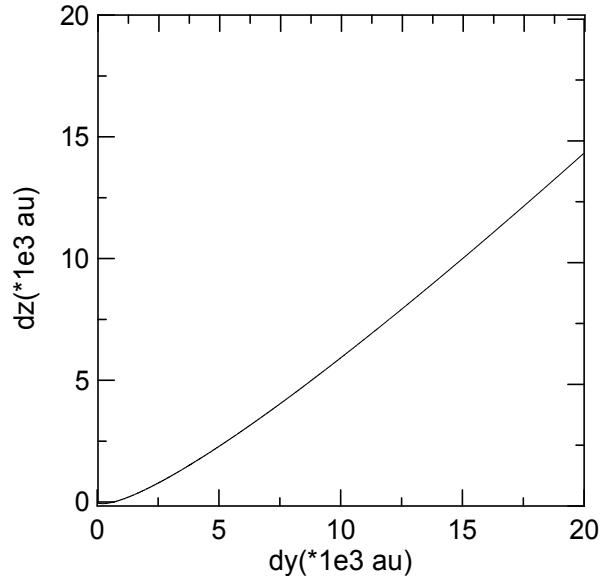


Fig. 3. The same as in Fig. 1 but between y , z coordinates.

To compute the orbital evolution of the comet C/2017 K2 (Panstarrs), we used the publicly available Orb-Fit v. 5.0.5 and 5.0.6 software. In the OrbFit v.5.0.5, we used the error model 'fcct14' described in [2], and in [3]; in v5.0.6, we used the error model 'vftc17' according to [4].

We used the JPL DE431 Solar System model with an additional 17 massive asteroids as described in [5] and in [6].

We made our orbital computations in heliocentric cartesian coordinates (x, y, z). Figs. 1, 2, and 3 present differences between the heliocentric rectangular coordinates (x, y), (x, z), and (y, z) in 900 years forward integration using the error models 'fcct14' and 'vftc17'. It is the visible influence of the error model on the propagation of the nominal orbit of the comet C/2017 K2.

RMS with the 'vftc17' error model gives a smaller value than the 'fcct14'. Hence gives better results.

Hence, different error models can lead to other solutions.

In 900 years, the x and z coordinates difference reaches 0.020 au! Therefore, predicting the evolution of comet C / 2017 K2 (Panstarrs) over long periods is burdened with a significant error and requires the use of a precise mathematical model of the comet's motion. Non-gravitational effects are not computed.

Acknowledgments: We want to thank the Space Research Center of the Polish Academy of Sciences in Warsaw for the possibility of working on a computer cluster.

References: [1] Włodarczyk I. (2020) *BulgAJ*, 32, 27.
[2] Chesley S. et al. (2010) *Icarus*, 210, 158.
[3] Farnocchia D. et al. (2015) *Icarus*, 245, 94. [4]
Veres P. et al. (2017), *Icarus*, 296, 139. [5] del Vigna et al. (2018) *A&A*, 617, A61. [6] Farnocchia, D. (2013), *Icarus*, 224, 1.