

# Selected OrbFit impact solutions of asteroids 99942 Apophis and 2004VD17

by

I. Włodarczyk

*Astronomical Observatory of the Chorzów Planetarium, WPKiW, 41-500 Chorzów, Poland  
e-mail: astrobit@ka.onet.pl; irek@planetarium.chorzow.net.pl*

Selected results of computations of possible impacts of Apophis and 2004VD17 with the Earth with the use of OrbFit software were presented during Meeting on Asteroids and Comets in Europe - May 12-14, 2006 in Vienna, Austria.

I have compared my impact solutions with those presented by JPL Sentry System (<http://neo.jpl.nasa.gov/risk/>) and by NEODYs CLOMON2 (<http://newton.dm.unipi.it/cgi-bin/neodys/neoibo?riskpage:0;main>).

In all my computations I have used two versions of OrbFit Software Package: 3.3.1 and 3.3.2 available at <http://newton.dm.unipi.it/neodys/astinfo/orbfit/>. These new versions of OrbFit give better results of computations of impact mainly with the use of non-linear monitoring and multiple solutions (Milani et al., 2002, Milani, 2005a and Milani et al., 2005b).

The main goal of my work was to compare my results obtained from accessible source code of OrbFit with the results presented by CLOMON2 SYSTEM which uses the same OrbFit software and with the analogous results of JPL NASA SENTRY.

The second purpose was to proof how different small effects in motion of asteroid influence impact solutions. It was possible thanks to free access to the source code of OrbFit.

Namely I have investigated the influence of the relativistic effects, radar observations, number of additional perturbing asteroids, different JPL Ephemeris of Solar System and the use of the multiple solution method.

It is worth it mention, that software allowed me to change output format and kind of output results. OrbFit is the interactive software. However, in order to use it properly, it requires some knowledge of celestial mechanics.

It appeared that the greatest influence on computing exact impact solution have relativistic effects and the close approaches of massive asteroids with Apophis and 2004VD17. To compute the number of the close approaching asteroids to Apophis and 2004VD17 the free software Solex from A. Vitagliano was used.

Using free OrbFit software and its source code I obtained almost the same results of possible impact solutions for Apophis and for 2004VD17 as folks on NEODYs www page. I have compiled source code using Intel Fortran Compiler for Linux v. 9.

The detailed results of my computations were submitted to the "Contributions of the Astronomical Observatory Skalnaté Pleso".

## **Acknowledgements.**

I am very thankful to some researches from OrbFit Consortium working in six research laboratories:

*<http://newton.dm.unipi.it/~neodys/astinfo/orbfit/OrbFit/doc/help.html#authors> for theirs free software and source code.*

Also, I am extremely thankful to Andrea Milani and Geny Sansaturio for constructive discussions during MACE 2006 and for generous help through e-mail exchanges.

I also thank Aldo Vitagliano for his discussion about Solex during Mace 2006.

I would like to thank Prof. Grzegorz Sitarski from the Space Research Center, of the Polish Academy of Sciences in Warsaw for his computed impact solutions of Apophis and 2004VD17 using his own method and profound and fruitful help.

I also would like to thank Rafal Bączkiewicz for help in unix version of OrbFit.

Many thanks to Marek Kmieciak from ASRC, the University at Albany (SUNY) for proof-reading of the English version.

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