New features in software OCFit

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Introduction

- OCFit – python package + GUI for fitting O-C diagrams of EBs and exoplanet transits

- package introduced on KOLOS 2016 (develop from 2015)

- GUI – KOLOS 2018 & Conference on Variable Star Research in Brno, 2018

- paper in OEJV: *2019OEJV..197...71G*

- available on GitHub: *github.com/pavolgaj/OCFit*

Code changes

- fully compatible with python3 (tested on 3.6 to 3.10)

- Monte Carlo fitting using emcee (NO pymc2) – better support, more detail control of fitting process

- saving data and parameters to JSON file (instead of PICKLE), saving more parameters

- small changes and bugfixes

New functions

- phase of secondary minima for eccentric orbits $\neq 0.5$

  - additional parameter for difference in epoch (dE) – given by user, calculated (e, ω) or estimated

- initial fitting using "differential evolution" (DE) – in scipy

- additional parameters in summary – dP, dP/P, dM…

- new model ApsidalQuad – apsidal motion + quadratic

- more plots for MC/GA/DE analysis – corner plot…

Changes in GUI

- most of the changes – about 75%

- dynamic size of windows

- new windows/buttons

- better control of inputs
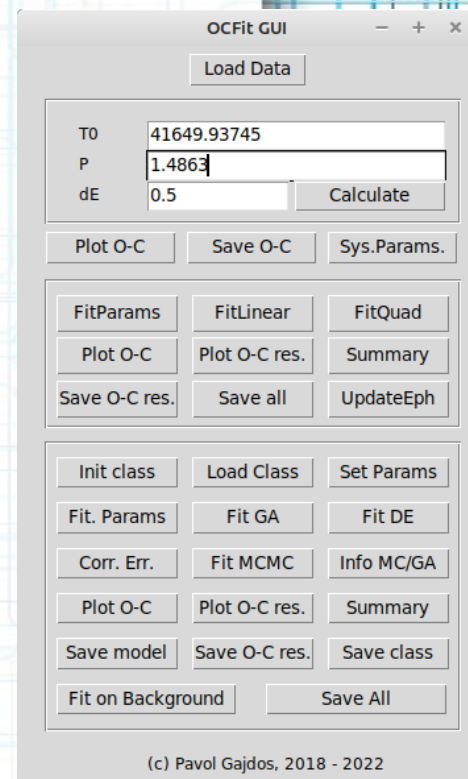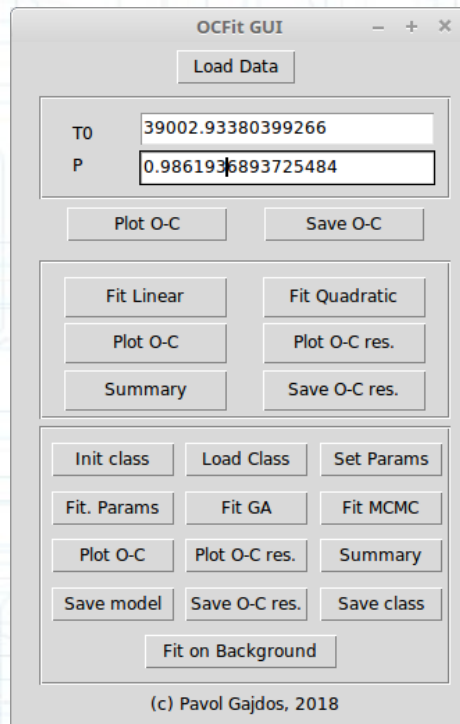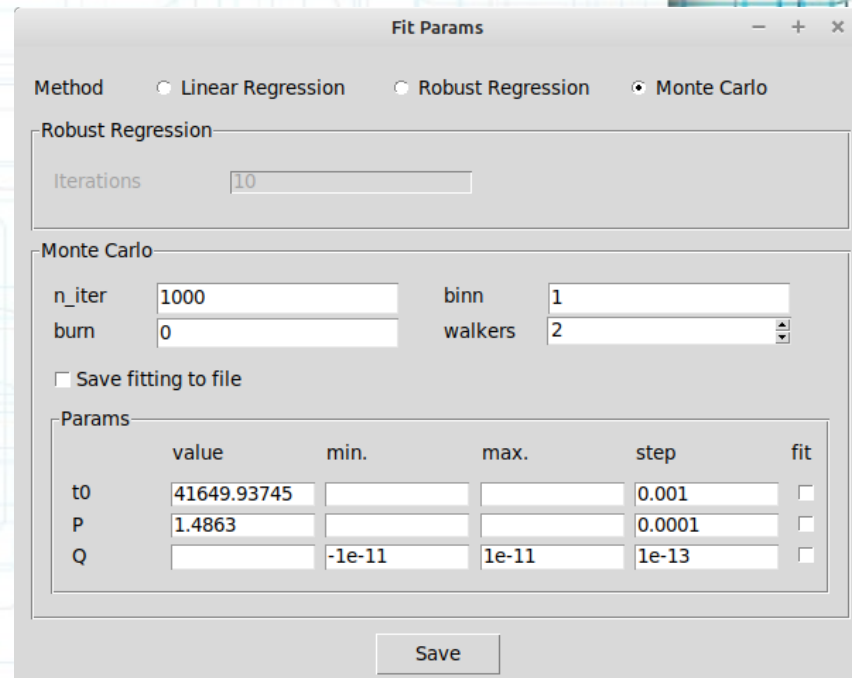
Changes in GUI

- new functions in GUI:

  - setting system parameters (M_1, M_2, M and i)

  - fitting using Monte Carlo for linear/quadratic model

  - update linear ephemeris manually

  - analysis of Monte Carlo fitting from file

  - save all figures and data by one button

  - correct (rescale) errors of data points

Changes in GUI

- setting method & parameters of fitting for FitLinear and FitQuad

- three methods – linear (standard) or robust regression, MC method

- parameters for MC fitting

Changes in GUI

- analysis of Monte Carlo or GA/DE fitting process

- loading from file – select good type!

- correlations between model's parameters

- successfulness of fitting – correct settings of fitting parameters
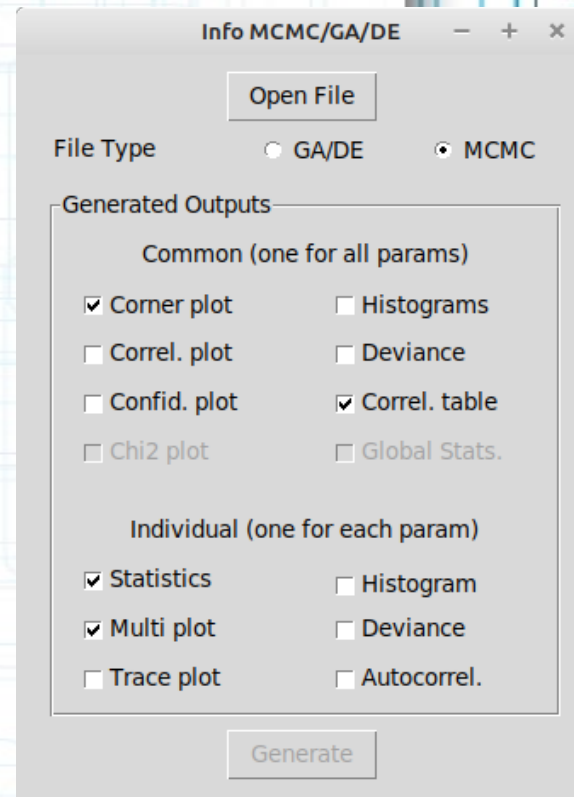
Conclusions

- code used by different astronomers around the world

- paper about OCFit cited 11-times (no self-citations)

- about 200 GitHub release downloads

- more than 2500 PyPi downloads (using pip install)

Thank you for your attention!