A simple interactive R-script with graphical user interface to plot model created by VStar

Version 0.03
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AAVSO Vstar (www.aavso.org/vstar), variable star data visualization program, can create light curve models in form of R expressions (R is “a free software environment for statistical computing and graphics” www.r-project.org). There is a script provided along with VStar to plot such models from within R environment (https://sourceforge.net/p/vstar/code/HEAD/tree/trunk/script/plot_model.R). However a user should modify the script itself to present model equation which is not too convenient. To make things easier a new script having interactive graphical interface have been developed.

Prerequisites

To use the script, R base system should be installed. The newest version of R can be downloaded from its official site www.r-project.org.
As far as the proposed script uses graphical interface, additional R packages should be installed in addition to R base system. It can be done from within R console. Start R (using a shortcut or typing R in terminal), then execute the following commands:

```
>install.packages("gWidgets")
```

(basic widgets library will be installed)

```
>install.packages("gWidgetstcltk")
```

(tcl/tk toolkit will be installed)

Installing the script

Download ZIP file from https://github.com/mpyat2/VStarModelPlot
(use [Clone and Download]->[Download ZIP]) then unpack it into a directory by your choice.
That zip file contains the following files:

`sampledata`	folder which contains sample data files: “data.txt” file contains sample lightcurve, “model.txt” contains model points (created by VStar) and “r-model.txt” with a text of a model equation. Files “data.txt” and “model.txt” can be opened and plotted (see explanation below); “r-model.txt” contains a text of an equation which can be copied and pasted into “VStar equation” textbox to plot (see below).
`plot_model2.R`	main R script
`run.bat`	batch file to run the application under Windows
`run`	bash script to run the application under Linux

Configuration and running

Under Windows:

1. Open “run.bat” batch file in notepad, define path to your R interpreter by setting RPATH variable and save it.

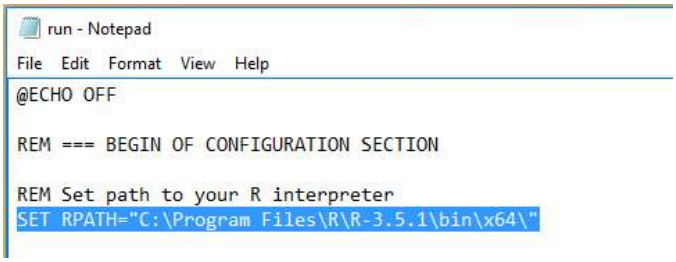

Fig. 1

2. Start “run.bat” batch file (you could make a shortcut to it on your desktop).

Under Linux:

1. Open terminal, go to a folder with unpacked files and make “run” bash script executable:
   ```
   $ chmod 777 run
   ```
2. Execute “run” script:
   ```
   $ ./run
   ```

Using the script

When started, the script shows the following dialog (after printing some messages to a terminal window):

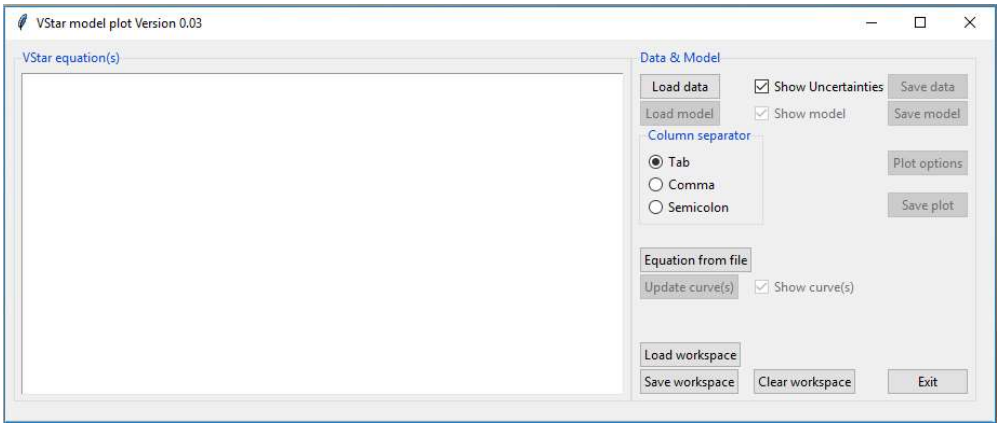

Fig. 2

"Load data" button is used to open a data file and plot a light curve. A text data file should contain at least two columns: the first is Julian Day numbers, the second is magnitudes. File can be tab- comma- or semicolon-separated, a kind of separator is selected by "Column separator" radio-buttons. A data file can contain the third column with uncertainties. Extra data columns are ignored. You can find an example of a data file inside "sampledata" subfolder.
After loading, the data is displayed in a R plot window. If data file contains the third column with uncertainties, they will be shown (if "Show uncertainties" checkbox is checked):

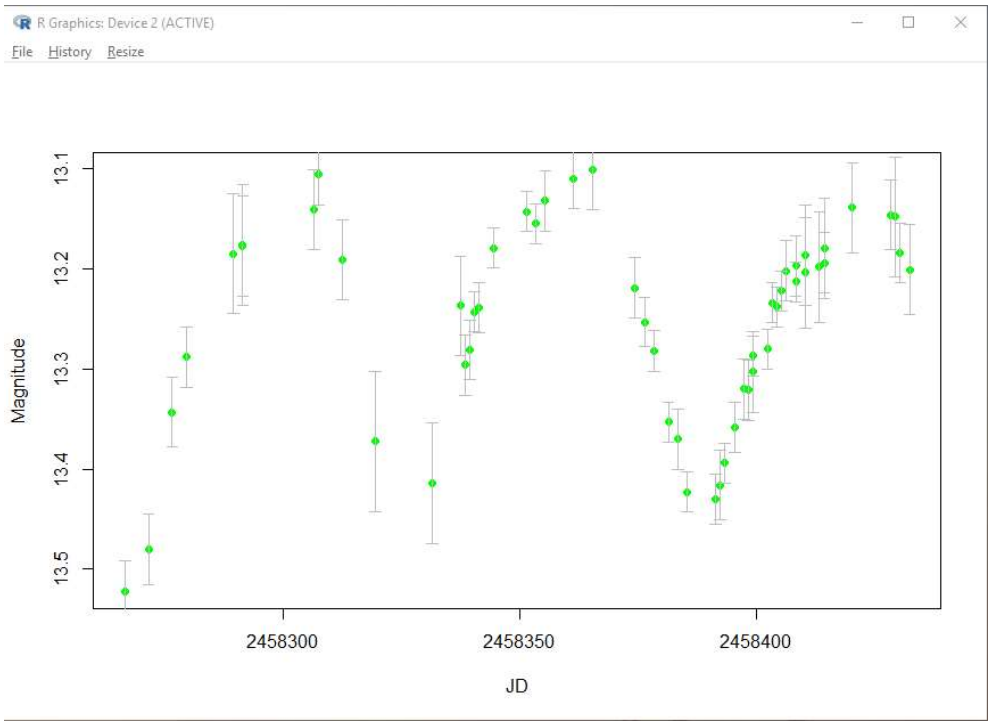

Fig. 3

When data is loaded, “Load model” button became active so user can load a data file containing model values (calculated by VStar and saved into a separate file):

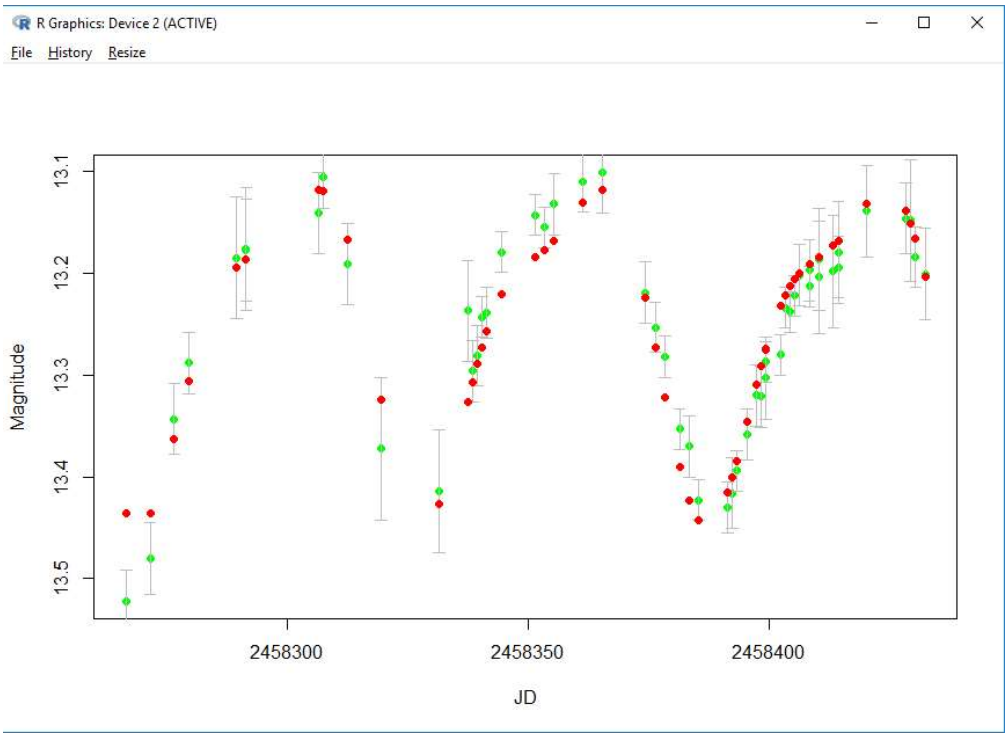

Fig. 4

A user can control a visibility of model values by “Show model” checkbox.

A model equation calculated by VStar can be copied from VStar's "Model Information" dialog and pasted into "VStar equation" field. Then pressing "Update curve(s)" button will plot the equation:

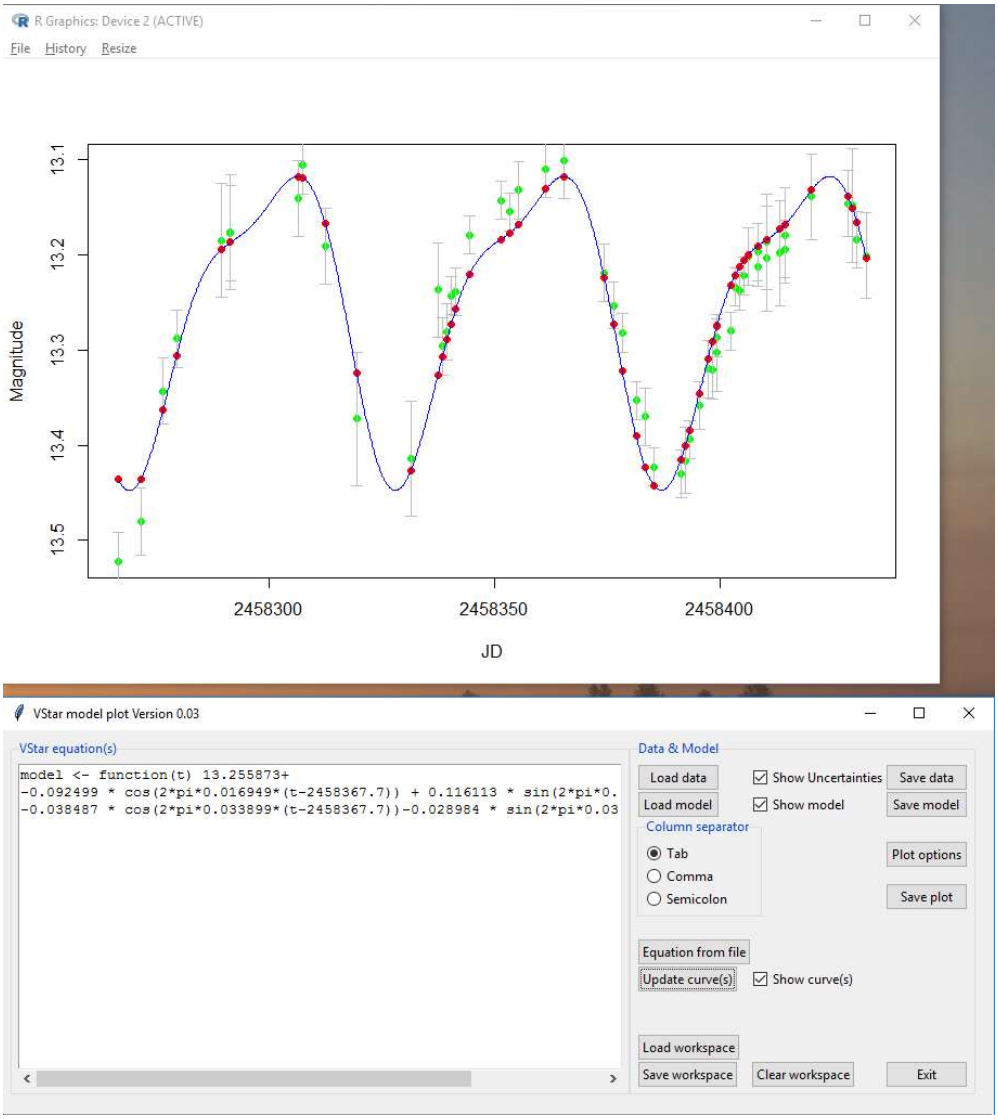

Fig. 5

You may plot several models at once. The equations must be separated by special comment line:
#$
(see Fig. 6).

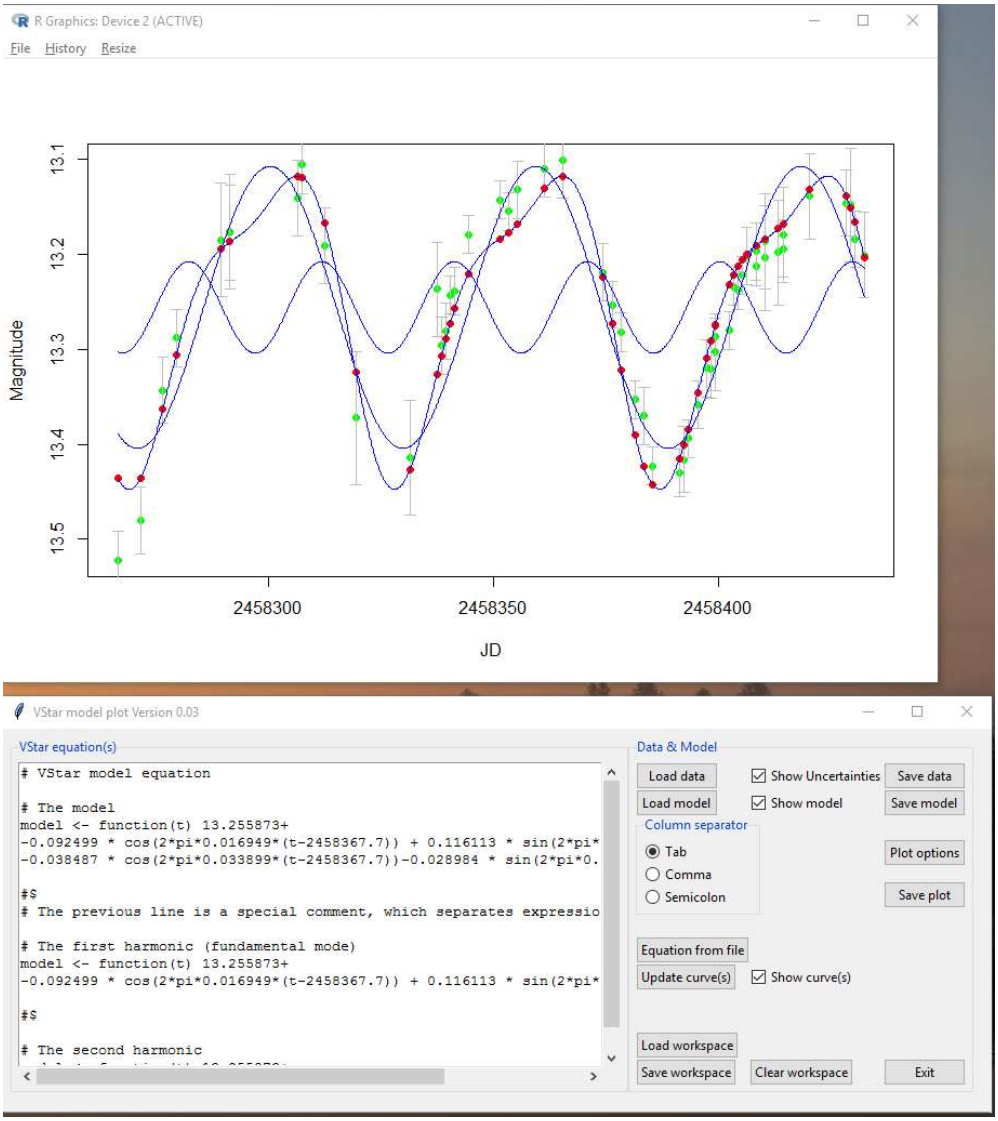

Fig. 6

The whole “workspace” can be saved into a file using “Save workspace” button; it can be restored lately with “Load workspace” button. A “workspace” file contains all data to be plotted. To “extract” data and model from a workspace, use “Save data” and “Save model” buttons respectively. See “sampledata” subfolder for an example a saved “workspace” file: “test.vsmodelplot”