Saturday, Jan 23, 2021 @ 4 PM UTC

**Peranso 3 • Lightcurve Analysis Software • Live Showcase**

Hosts: Gabriel Cristian Neagu and Tonny Vanmunster
Agenda

1. Welcome & Introduction to Peranso
   Gabriel Cristian Neagu – Tonny Vanmunster

2. End-to-end analysis of an eclipsing binary light curve, using ZTF data
   Gabriel Cristian Neagu

3. Finding multi-periodicities in an AAVSO light curve
   Tonny Vanmunster

4. Detecting long term period evolutions in a Mira variable light curve
   Tonny Vanmunster

5. What’s Next in Peranso & Adjourn
   Tonny Vanmunster – Gabriel Cristian Neagu
Welcome & Introduction to Peranso

• Active variable star observer since 1975; switched to CCD observations exactly 25yrs ago
• Pro-am co-operation: many professional astronomers (variable stars, exoplanets, …)
• Publication of papers -> professional tools for period analysis were scarce and not easy accessible for amateur astronomers
• Software engineering background
• Triggered appetite to write own period analysis software, with focus on ease of use
• Started around 2004 with Peranso 1 -> period analysis
• Extended with light curve analysis functions around 2006 (Peranso 2)
• Around mid 2019: rewrite of Peranso from scratch to take advantage of Internet, .NET, access to wide variety of variable star data sources (surveys, AAVSO database, …)
• Peranso 3: launched last days of 2020
• Today, Peranso is used by several hundred of amateur and professional astronomers around the world, and cited in dozens of publications
2. End-to-end analysis of an eclipsing binary light curve, using ZTF data
Finding multi-periodicities in an AAVSO light curve

• Extract multi-periodic signals from the light curve\(^1\) of RV Tauri

• RV Tau is prototype star of the RV Tauri type variables: radially pulsating supergiants showing alternating primary and secondary minima

• We will use the CLEANest method as described by Grant Foster in a 1995 paper

• We will illustrate how to auto-detect multi periodicities using Peranso

• More information: see Tutorial 4 of the Peranso User Guide @ www.peranso.com

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\(^1\) We acknowledge with thanks the variable star observations from the AAVSO International Database contributed by observers worldwide, and used in this research.
• Periods of many variable stars are not stable over time

• **T UMi** is a semi-regular variable star (giants or supergiants having intervals of quite regular periodicity, but sometimes interrupted by various irregularities)

• We will use the **WWZ (Weighted Wavelet Z-Transform) method** described by Grant Foster in his excellent book *“Analyzing Light Curves – A Practical Guide”*

• We will detect the period evolution of T UMi over a period of almost 100 years

• More information: see **Tutorial 5** of the Peranso User Guide @ [www.peranso.com](http://www.peranso.com)

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5. What’s Next in Peranso & Adjourn

- Removal of outlier observations
- Direct plot of Pan-STARRS light curves (similar approach as with AAVSO, ZTF, ASAS)
- Direct plot of Catalina Survey CSDR2 light curves
- Support of Kepler, TESS light curves (either import from file or direct plot)
- Support of NSVS, SuperWASP, etc (either direct import from file or direct plot)
- Import of ALCDEF (Asteroid Light Curve Data Exchange File)
- Save to PNG file
- Legend-in-window
- Data mining - automation: import file with coordinates (or names) of objects and Peranso will auto-create an ObsWin per object and store ObsWin to a file

- Tentative
  - Novel period analysis methods: “Event Data” periodogram, which uses time of arrival of events (e.g., pulsar pulses)
  - Two-dimensional Fourier analysis method for analysis of tumbling asteroids
Thank you for attending
www.peranso.com