Package ‘galisats’

July 21, 2025

Title Configuration of Jupiter's Four Largest Satellites

Version 1.0.1

Description Calculate and plot the configuration of Jupiter's four largest satellites (known as Galilean satellites) for a given date and time (ET - Ephemeris Time).
The 'galsat' function returns numerical values of the satellites’ positions.
x – the apparent rectangular coordinate of the satellite with respect to the center of Jupiter’s disk in the equatorial plane in the units of Jupiter’s equatorial radius; X is positive toward the west,
y – the apparent rectangular coordinate of the satellite with respect to the center of Jupiter’s disk from the equatorial plane in the units of Jupiter’s equatorial radius; Y is positive toward the north.
For more details see Meeus (1988, ISBN 0-943396-22-0) ``Astronomical Formulae for Calculators''.

License MIT + file LICENSE

Encoding UTF-8

RoxygenNote 7.3.2

Imports graphics, png

URL https://lechjaszowski.github.io/galilean_satellites/

NeedsCompilation no

Author Lech Jaszowski [aut, cre, cph] (ORCID: <https://orcid.org/0009-0001-4748-9603>)

Maintainer Lech Jaszowski <lech.jaszowski@interia.pl>

Repository CRAN

Date/Publication 2025-07-21 09:51:31 UTC

Contents

`galsat` *Calculate & draw the positions of the Galilean satellites*

Description

`galsat()` is used to determine the positions of the four greatest satellites of Jupiter (called Galilean satellites). Positions are shown on the plot for any given time (ET – Ephemeris Time) with respect to the planet, as seen from the Earth.

The `galsat()` function returns numerical values of the satellites' positions:

x – the apparent rectangular coordinate of the satellite with respect to the center of Jupiter's disk in the equatorial plane in the units of Jupiter's equatorial radius; X is positive toward the west

y – the apparent rectangular coordinate of the satellite with respect to the center of Jupiter's disk from the equatorial plane in the units of Jupiter's equatorial radius; Y is positive toward the north

Usage

```
galsat(year, month, day, hour, minute)
```

Arguments

`year`	Type in the year (integer number greater then or equal 0).
`month`	Type in the month (integer number from 1 to 12).
`day`	Type in the day (integer number from 1 to 31).
`hour`	Type in the hour (integer number from 0 to 23).
`minute`	Type in the minute (integer number from 0 to 59).

Details

The function is based on algorithms in the book: Astronomical Formulae for Calculators (4th edition), Jean Meeus, Willmann-Bell Inc., 1988

Value

`data.frame`: 4 observations of 3 variables: $ moon: chr "Io" "Europa" "Ganymede" "Callisto" $ x : num $ y : num Four rows - each row has the position (x,y) of one moon. Additionally, the positions of the moons are shown graphically.

Examples

```
galsat(2025, 10, 13, 23, 30)
```

Index