

Simulation of Jupiter's Galilean Satellites

An Application for the Macintosh

by

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Jupiter's Galilean satellites have provided viewing interest for astronomers since the 1600's. Sky and Telescope magazine regularly publishes their positions v. time for each month. This only gives the x-coordinate however. Using a published algorithm, both the x- and y-coordinates are calculated and presented in three forms.

The top window gives the classical display seen in Sky and Telescope., giving x-coordinate v. time graphically. The middle window gives a telescope eye view of Jupiter and the satellites updated for each time interval in the manner of a slide show. Each satellite is displayed on the disk when transiting Jupiter and not drawn when it is occulted. Eclipses are not displayed due to lack of phase angle calculations. (The phase angle is the Sun-Jupiter-Earth angle.) The bottom window gives the graphical data for each time interval. The positions given are accurate to within 0.1 Jupiter radii.

Once executed, the month, day and year are input (ex.: 1,1,1988.) Decimals of a day are accepted and the time scale used is Universal Time. The second input is the time interval between updates. The default value is 0.5 hours, which gives the best graphical display in the upper window. Once the simulation is running, keystroke commands control it. Typing "Q" quits the simulation; "R" allows another date/interval to be entered; and any other key pauses the simulation (a second keystroke restarts the simulation.)

This simulation of Jupiter's Galilean satellites is based on the algorithm found in Jean Meeus' book, *Astronomical Formulae for Calculators* (pp. 175-183), was written using the ZBasic compiler, and was written and debugged on a Macintosh SE.

This program is shareware, and as such, no fee shall be charged for its distribution, nor shall it be offered as an inducement to buy other software or hardware. If you find this software useful and decide to keep it, please send \$5.00 to me at

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