ParadeofPlanets.nb

Who asks: 17.10.2001 Professor Dr. Gerd Baumann
Handling: 22. 6.2002 - 14. 2.2003 Norbert Südland
Last Calculation: 23. 6.2002 Norbert Südland

■ 2.1. Question

Is it possible to confirm by use of well-known astronomical models, that the epoch of the Israelian calendar (autumn 3761 before Christ—see [Knau1951], keyword *"Zeitrechnung"*, page 1963) is connected to a parade of the planets?

■ 2.2. Preparation

■ 2.2.1. Definitions

To understand the given question, it is important to use the definition of *epoch* in its original meaning. Thus there are some cites ([Zem1987], section 1., page 15):

■ *Chronologie*

Die Chronologie ist die Wissenschaft von der Zeiteinteilung und der Zeitrechnung über längere Perioden der Geschichte.

■ *Translated: Chronology*

Chronology is the science of timing and giving timetables for longer periods of history.

■ *Ära*

Ära oder Zeitrechnung, Jahresrechnung ist eine Periode der Geschichte, für die ein bestimmtes Verfahren der Datumsfestlegung und insbesondere der Jahreszählung gilt. Die Darstellung in diesem Buche geht naturgemäß von der bei uns eingeführten Ära aus, von der Christlichen Ära.

■ *Translated: Era*

Era or chronology, calculation of years is a period of history of which a specific method of fixing the date and especially the counting of years is valid. The description of this book naturally starts with the era being used by us, with Christian era.

■ *Epoche*

Zum Unterschied vom allgemeinen Sprachgebrauch heißt in der Chronologie Epoche *der Anfangstag einer Ära. Der 1JAN 1nChr ist die Epoche der Christlichen Ära.*

■ *Translated: Epoch*

In opposite to the general usage ***epoch*** *in chronology is called the beginning day of an era. January 1st 1 after Christ is the epoch of Christian era.*

There is a need to emphasize that within other elaborations there is mentioned *historic* in the meaning of *chronology* being described here, especially when using historical notes.

■ 2.2.2. Program

To calculate by *Mathematica* correctly, first the Scientific Astronomer is to be loaded:

```
<< Astronomer`HomeSite`;
```

Astronomer is Copyright (c) 1997 Stellar Software

The data of **HomeSite** does not play a role here. In spite of this and because of considerations about thoroughness the position of Rome is chosen, thus the Gregorianic calendar reform takes place at a well-known point of time:

```
SetLocation[GeoLongitude -> 12.5 * Degree,
    GeoLatitude  -> 41.8 * Degree,
    GeoAltitude  -> 0.02 * KiloMeter,
    TimeZone     -> 2];
```

The geographical statements are due to Diercke Weltatlas ([Die1979], map I and II, page 78). The level of the Tiber river at the end of the place of Rome still is **13 *m* above sealevel** thus the chosen **20 *m*** should fit to a dwelling-house of Rome.

■ 2.3. Answer

■ 2.3.1. Starting Point

A well-known astronomical model has been used with the Scientific Astronomer. There is a possibility to draw an overview of the solar system depending on the date being a help to find a parade of planets (meaning that all planets quasily fit to a line):

? SolarSystemPlot

SolarSystemPlot[date] returns a two−dimensional graphic showing the general layout of how the solar system would look on the given date. The Earth is the blue dot at the center, and the Sun is the yellow dot. Planets that happen to be near the yellow line (such as Venus and Mercury which always are), can only be seen from Earth at dusk or dawn. Planets near the red line are high in the sky when the Sun sets, and hence they are visible only in the evening sky for a time until they set in the west. Similarly planets near the blue line are high in the sky when the Sun rises, and hence they are visible only in the morning sky for a time after they rise in the east. Planets nearly 180 degrees away from the yellow line, are visible all night long. Use the option Distance to show a bigger or smaller field of view. For example SolarSystemPlot[{1993,11,17}, Distance−>3∗AU]. The default distance is Distance−>12∗AU which goes out to just past Saturn. The option Moon−>False can used to suppress the Moon's image on the edge of the graphic. And you can use the option ViewPoint−> Sun to put the Sun, rather than the default Earth, at the center. When the ViewPoint is not Earth, the morning and evening sky lines are suppressed. Use the MagnitudeScale option to increase the size of planets. Use the Planets option to specify a subset of the planets, or to add other objects such as asteroids. To remove the date label, use Text−>False. If date is omitted the current Date[] is used.

The *Mathematica* of Wolfram until now uses the following format of date in Chinese order:

? Date

Date[ ] gives the current local date and time in the form {year, month, day, hour, minute, second}.

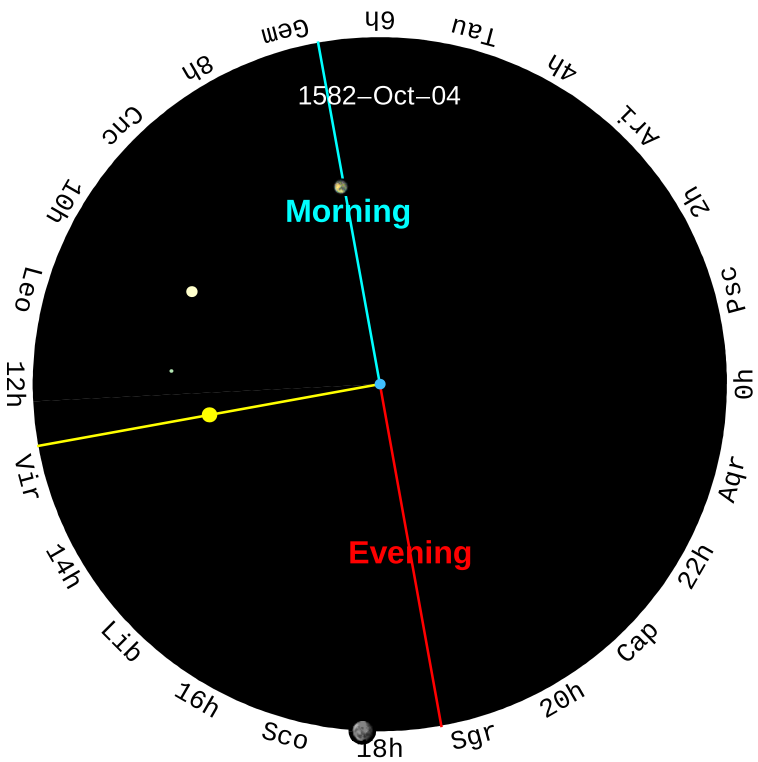
■ 2.3.2. Corrections

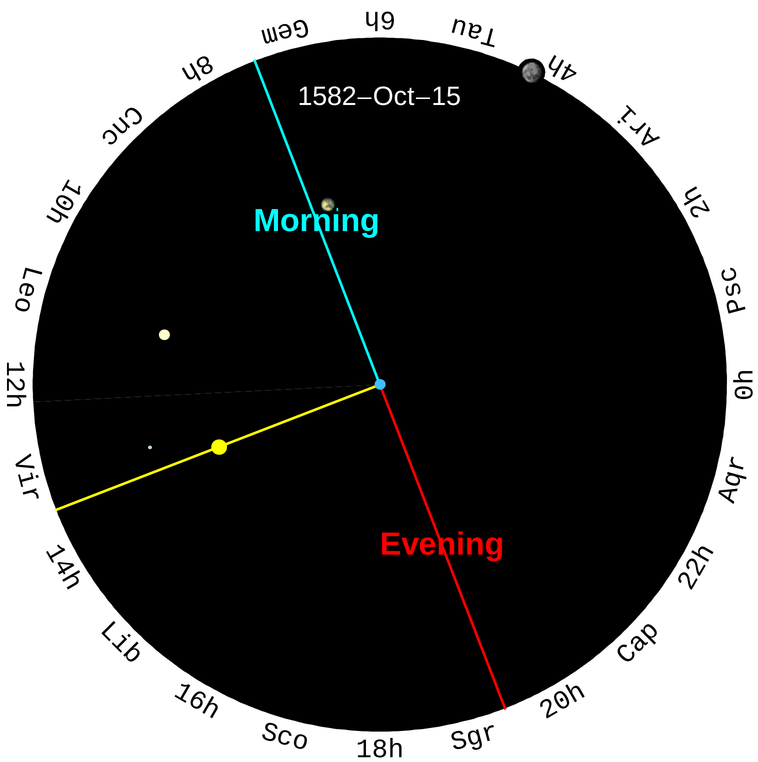
■ 2.3.2.1. Gregorianic Calendar Reform

The date given in by **Date[ ]** does NOT respect the Gregorianic calendar reform, because of which October 4th, 1582 (Thursday) already has been followed by October 15th, 1582 (Friday). This statement is valid for Rome (see [Zem1987], section 2.7, pages 29-34), while at St. Petersburg not before 1917 a transposition of calendar took place by a jump of already 13 days.

As an illustration the following sky is plotted, where unequivocally a good third of a month is pasted through:

```
SolarSystemPlot[{1582, 10, #}, Distance → 2 AU] & /@ {4, 15};
```



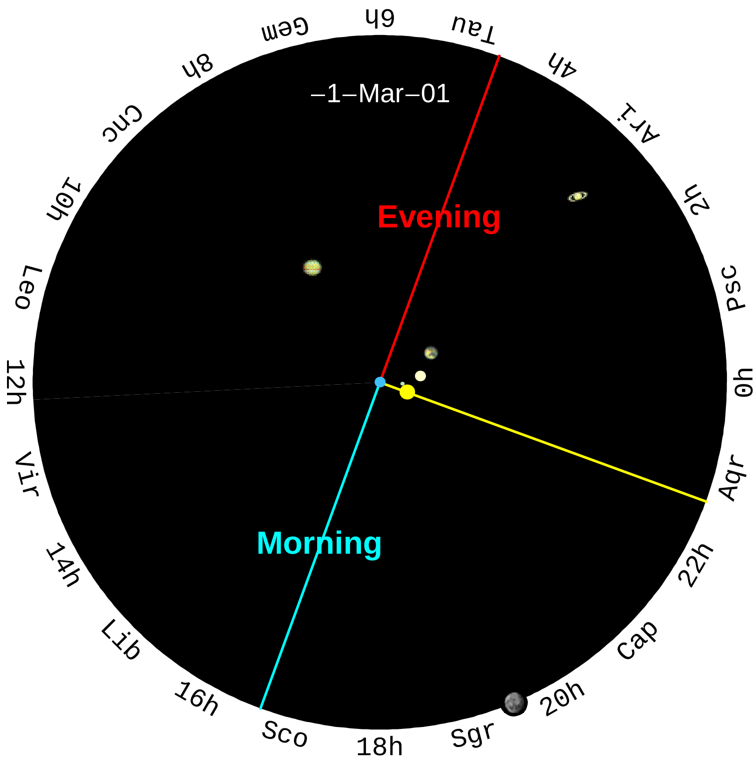


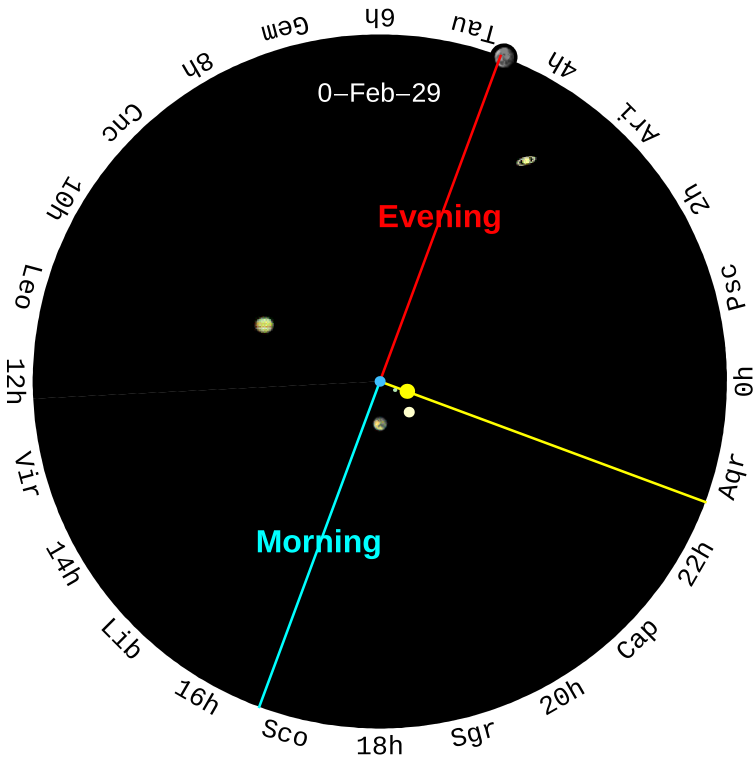
■ 2.3.2.2. Character of Ordinal Numbers Overlooked

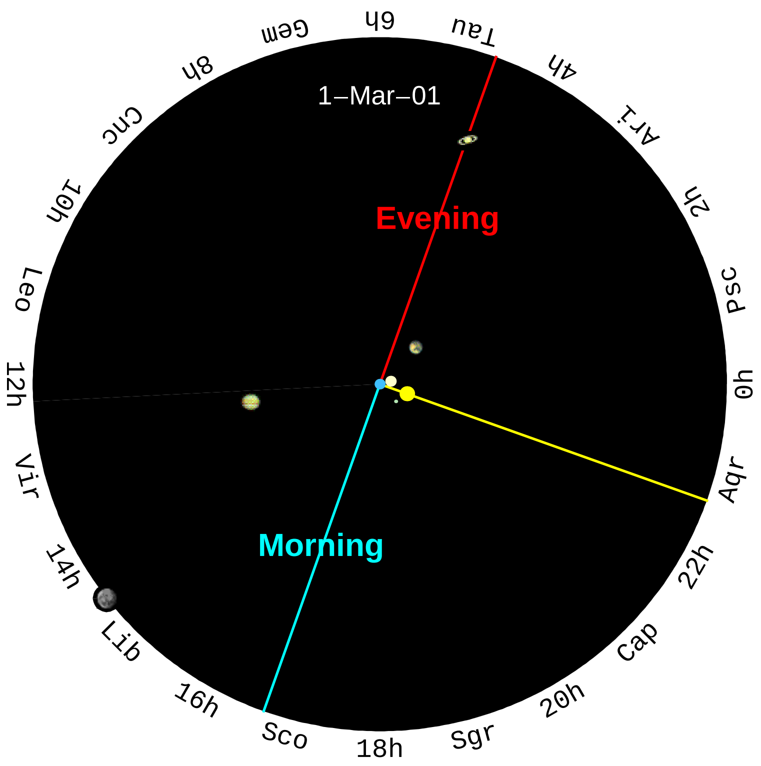
The year Zero does not exist in a chronology, but rather at the Scientific Astronomer. Thus when using the Astronomer with dates before Christ one year is to be added to get the historical numbering of years. Numbers of years need an arithmetic of ordinal numbers of course being programable.

To illustrate this the following sky is presented which actually should show two identical constellations:

SolarSystemPlot[{#, 2, 29}] & /@ Range[−1, 1];







■ 2.3.2.3. Julianic Calender Reform

Furthermore there has been no leap-year before the Julian calendar started (45 before Christ, by Caius Julius Caesar; see [Zem1987], section 2.64, page 27) leading to some hundred of days discrepancy when using the Israelian epoch. The Egyptian solar year with exact **365** days within **1461** Egyptian years leads to **1460** Julian years:

1460 / 4

365

■ 2.3.2.4. Biblical Tradition of Further Discrepancies

In the 14th year of king Hezekiah due to Isaiah 36,1 and Isaiah 38,1.5.8 the shadow of the sun-dial went back **10** units (hours) which it already had been moved forward. Because of this there are severe discrepancies when comparing astronomical models and astronomical notes of the eighth century before Christ and earlier.

Due to Joshua 10,13.14 during the capture battle of the land of Canaan the sun and the moon were at the same place of the horizon almost a whole day long, thus there are further details to be respected when comparing model calculations and notes of earlier than the 15th century before Christ.

The description of the great flood (which due to a harmonization [WS2002] of Israelian calendar and biblical statements took place between 2460 before Christ and 2449 before Christ with a duration of **370 days**) is given by the Holy Bible in a way, that **150 days** (Genesis 7,24) and **5 month** (Genesis 7,11 and Genesis 8,3.4) can be used as synonyms. Variations of the duration of a day play a certain role when considering a floated earth being reduced to half of its diameter [Egy1957] and the duration of rotational moment. One can imagine, that earlier than the great flood, a year could have had **360 days** with eventually different diameter of the earth. There are unconfirmed hints from palaentology [Scru1964] showing with petrified corals a period of **30 days** to be a month. The interpretation of fossils due to Martin Luther (1483-1546) and Johann Jacob Baier (1677-1735), the founder of palaentology, *to be memorials of the great* *flood* ([Reck1998], pages 156-163) has been prohibited especially during the 20th century. But because of didactics of the subject this cannot be kept secret.

■ 2.3.2.5. Estimation for the Concrete Question

Due to the criterions given, a parade of planets is to be searched about not at September 21st, 3761 before Christ, but at least one year and some hundred days later. Between the starting of the Julian calendar and the epoch of the Israelian chronology there are circa 3700 years, leading until circa

$$\frac{3761-45}{1460}\ \text{"years"}\ //\ N$$

2.54521 years

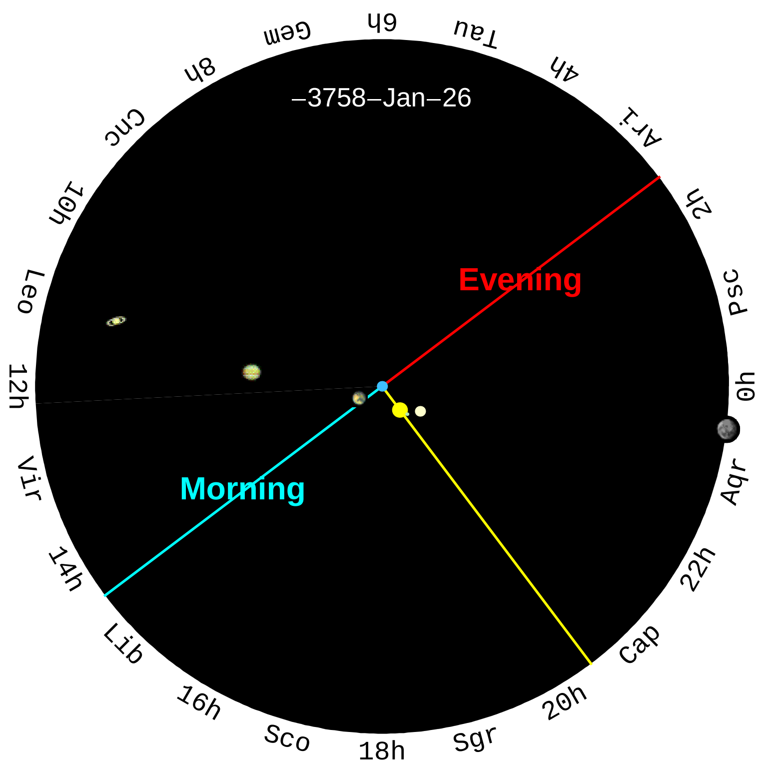
of tolerance. If a parade of planets is found between autumn 3760 before Christ and spring 3757 before Christ (each according to the simplified date of the Scientific Astronomer!), then the epoch of the Israelian calendar as the date of creation is connected to a parade of planets.

■ 2.3.3. Attachment to a Parade of Planets

The outer planets are not known of for long times and have got large revolution times, thus for the first time the search for a parade of planets is limited to the planets until Saturn inclusive, which have been known in antiquity, too.

The result is a comparatively convincing parade (the sun separates Venus and Merkur!) at the following "date":

```
SolarSystemPlot[{-3758, 1, 26}, Distance -> 12 * AU, MagnitudeScale → 1];
```



This date can be interpreted as autumn 3761 before Christ, where the center of the critical interval is hit. A biblical date of creation orientates at this event. The calculated position of the moon corresponds circa to the third or fourth day after the Jewish new moon (begin of a month).

The question whether the earth joined the parade or not, just hardly can be discussed by the model being used here, because the historical corrections at comparison of calculation and tradition should start at a point of time being less far away. Also the position of the moon might be corrected as soon as it is verified (and computable).

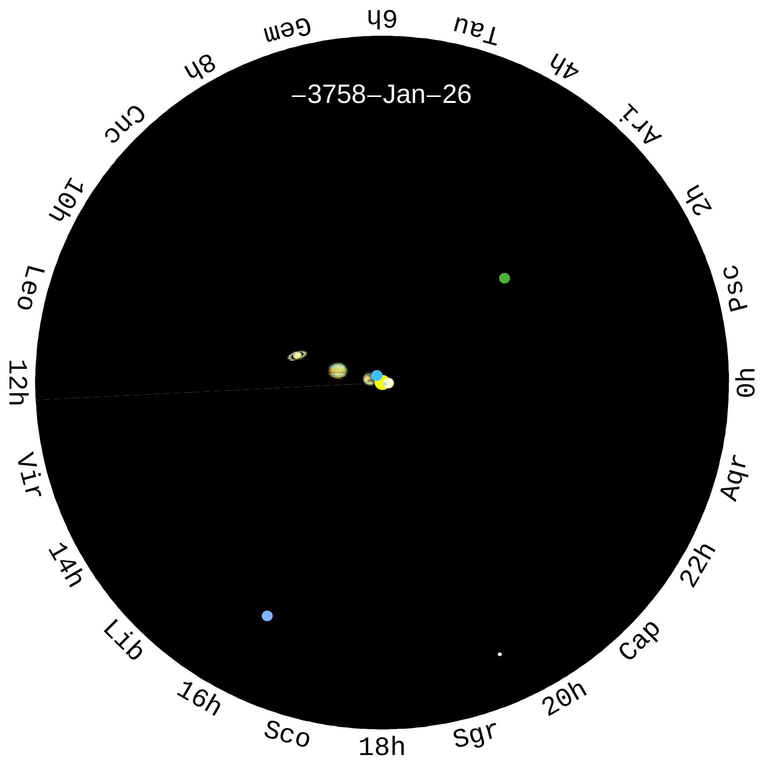
The calculated position of the earth mainly has got didactical advantages (in opposite to Adam and Eve):

- The three night planets are positioned on a line being seen from the earth
  and could be seen well at the morning (of creation Sabbath).
- Venus as the evening planet and the new moon could be seen immeadetely
  (at the 6th day of creation).
- Merkur could not be seen until the first eclipse of the sun.
- A repeat of this constellation will happen at least not very frequently.

With the present astronomical models there is a need of a huge abstraction skill to classify a parade of planets to be the epoch of a chronology erroneously. Thus there are good reasons to discuss the Israelian epoch to be verified.

If the whole known solar system until Pluto is taken into consideration, there is no continuation of the parade of planets:

SolarSystemPlot[{−3758, 1, 26}, Distance −> 40 ∗ AU, `MagnitudeScale` → 1, ViewPoint → Sun];



This constellation moreover emphasizes a comparatively balanced total rotative moment of the system, where Pluto at a distance of six light hours accordingly could not be seen on the earth at the fourth day of creation anyway. The distance to Pluto has been the farest distance surely measured (by the runtime of the signals of the Voyager probes) in the outer space.

■ 2.3.4. Variation of the Astronomic Models

To elucidate the result the identifying parameters of the two outer-most planets are given:

? Neptune

Neptune is the eighth planet orbiting the Sun.
EquatorialRadius : 25,269km
RotationPeriod : 16h07m
RotationAxisTilt : 28.80 Degree
Oblateness : 0.017
OrbitalSemiMajorAxis : 30.0578 AU
OrbitalPeriod : 164.81 Year
OrbitalInclination : 1.77 Degree
OrbitalEccentricity : 0.0086

? Pluto

Pluto is the ninth planet orbiting the Sun. Pluto is really a binary planet with a partner named Charon.
EquatorialRadius : 1,162km
RotationPeriod : 6.387days
RotationAxisTilt : 122.5 Degree (Sideways)
Oblateness : 0
OrbitalSemiMajorAxis : 39.8151 AU
OrbitalPeriod : 248.53 Year
OrbitalInclination : 17.13 Degree
OrbitalEccentricity : 0.25515

Planet Pluto has been discovered ([Knau1951], keyword *Pluto*, page 1282) in 1930, thus the revolution periode is admitted of certain corrections.

Variations to Newton's gravitation law at least can be done according to Newton or Einstein thus the orbit represents the long-time motion of planets being aspired to. This kind of corrections do not change the character of the parade of planets being attached to.

The Scientific Astronomer (as well as historical astronomy) lacks of a date being subdivided with respect to historical chronologies. The harmonization [WS2002] of the Israelian calendar with biblical statements has been enough challenging, which of course might be refined by further elaborations.

■ 2.4. Protocol

The Version of *Mathematica* has been:

```
{$Version, $ReleaseNumber, $LicenseID}
```

{Microsoft Windows 3.0 (October 6, 1996), 0, L4526−3546}

The calculation time was (in seconds):

TimeUsed[]

9.19

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