

**KAJIAN TEORETIS DAN KOMPUTASI GERHANA
MATAHARI TOTAL MENGGUNAKAN SOFTWARE
MATLAB**

SKRIPSI

Untuk memenuhi sebagian persyaratan
mencapai derajat Sarjana S-1

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Yang menyatakan,



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MOTTO

فَإِنْ مَعَ الْعُسْرِ يُسْرًا ﴿٥﴾

"Karena sesungguhnya sesudah kesulitan itu ada kemudahan."
(QS. Al-insyiraq : 5)

-Do the best and give the best-



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Penyusun,

DAFTAR LAMBANG DAN ISTILAH

Lambang	Arti
X_0, X_1, X_2, X_3	Elemen bessel variabel X orde 0, 1, 2, dan 3
Y_0, Y_1, Y_2, Y_3	Elemen bessel variabel Y orde 0, 1, 2, dan 3
d_0, d_1, d_2	Elemen bessel variabel deklinasi orde 0, 1, dan 2
M_0, M_1	Elemen bessel variabel M orde 0 dan 1
L_{10}, L_{11}, L_{12}	Elemen bessel variabel L_1 orde 0, 1, dan 2
L_{20}, L_{21}, L_{22}	Elemen bessel variabel L_2 orde 0, 1, dan 2
$\tan f_1$	Rasio kerucut penumbra – radius bumi
$\tan f_2$	Rasio kerucut umbra – radius bumi
TD	<i>Dynamical Time</i>
UT	<i>Universal Time</i>
T_0	Waktu referensi terjadi puncak gerhana dalam TD
ΔT	Selisih waktu universal (UT) dengan waktu dinamis (TD) (detik)
K	Lebar lintasan gerhana
a	Sumbu semimayor atau radius ekuator bumi
b	Sumbu semiminor atau radius kutub bumi
e	Eksentrisitas ellips
L_2	Radius kerucut umbra
L_2'	Bayang-bayang umbra
B	Magnitude umbra bulan.
L_1	Bayang-bayang penumbra
L_1'	Bayang-bayang penumbra
H	Sudut jam (<i>Hour angle</i>)
M	<i>Ephemeris hour angle</i>
X	Titik potong bidang fundamental dengan ekuator yang bernilai positif ke arah timur
Y	Titik potong bidang fundamental dengan ekuator yang bernilai positif ke arah utara

(Lanjutan)

Lambang	Arti
t	Pengukuran waktu dalam jam dari waktu referensi
γ	Jarak sumbu bayangan bulan ke pusat bumi
u	Radius kerucut umbra bulan pada bidang dasar (<i>fundamental plane</i>)
ω	Faktor skala jari-jari ekuator dengan jari-jari kutub
ϕ	Sudut lintang menurut pusat bumi
f	Pemampatan permukaan bumi
α	Lintang geografis
λ	Bujur geografis
c_T	Tetapan rasio kala rotasi tropis dengan sideris (0,997969561343)
ρ	Jari-jari khatulistiwa bumi
φ	Lintang geodetik
φ'	Lintang geosentrik

KAJIAN TEORETIS DAN KOMPUTASI GERHANA MATAHARI TOTAL MENGGUNAKAN SOFTWARE MATLAB

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INTISARI

Berdasarkan ilmu astronomi, fenomena gerhana matahari dan bulan dapat diperhitungkan dimana dan kapan terjadinya, bukan karena kematian atau kehidupan seseorang maupun tanda bencana. Fenomena gerhana matahari total (GMT) pada 09 Maret 2016 dapat dimanfaatkan sebagai momentum kebangkitan ilmu astronomi di Indonesia dan memberikan edukasi astronomi kepada masyarakat. Penelitian ini bertujuan untuk mengkaji fenomena gerhana matahari berdasarkan sudut pandang islam dan sains serta memprediksi gerhana matahari total dari tahun 2016-2100. Penelitian ini menggunakan metode Besselian dan perhitungan algoritma Meeus yang diimplementasikan pada *software* Matlab R2012b. Hasil yang diperoleh dari penelitian ini, bahwa simulasi prediksi GMT dengan metode Besselian yang berasal dari perpaduan algoritma VSOP87 (untuk matahari) dan ELP2000-82 (untuk bulan) menggunakan *software* matlab R2012b dapat digunakan sebagai acuan untuk prediksi gerhana matahari total berikutnya sampai tahun 2100. Sebagai contoh simulasi pada penelitian ini adalah GMT 09 Maret 2016 yang memiliki selisih durasi totalitas sekitar 0,5 detik dibandingkan dengan prediksi NASA. Hasil simulasi prediksi gerhana matahari berdasarkan beberapa contoh memiliki selisih 0,04-0,21 detik dengan selisih durasi totalitas rata-rata 0,12 detik dari prediksi NASA.

Kata Kunci : Algoritma Meeus, GMT, Matlab, Metode Besselian

STUDY THEORITICAL AND COMPUTATIONAL OF THE TOTAL SOLAR ECLIPSE USING MATLAB SOFTWARE

Siti Hodijah
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ABSTRACT

Based on astronomy science, the phenomenon of solar and lunar eclipses can be taken into account where and when it happens, it wasn't because personal mortality and natality or disaster sign. The *Total Solar Eclipse* (TSE) phenomenon on March 09st, 2016 became revival astronomy science in Indonesia and provide public astronomy education. This research aims to examine the total solar eclipse phenomenon from the viewpoint of Islam and science and predicted TSE on 2016 until 2100. This research methods using Besselian and calculations Meeus algorithms implemented in Matlab R2012b software. The results obtained, simulation TSE prediction combine from VSOP87 (to the sun) and ELP2000-82 (for the month) algorithms on Matlab R2012b could be reference for the next total solar eclipse predictions until 2100. As an example of simulation TSE prediction are TSE on March 09st, 2016 had 0.5 seconds scale duration of totality compared with NASA prediction. The results simulation TSE prediction based on several instances had 0.04 to 0.21 seconds scale and 0.12 seconds average scale duration of totality from NASA prediction.

Keywords: Besselian Methods, Matlab, Meeus Algorithm, TSE

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BAB I

PENDAHULUAN

1.1 Latar Belakang

Perjalanan semu harian matahari yang terbit dari timur dan terbenam dari barat merupakan sebuah dialog keharmonisan dan keteraturan pergerakan orbit benda langit termasuk matahari, bulan dan bumi. Eksistensi peredaran gerak semu matahari memberikan arti terpenting khususnya bagi pengamat ilmu falak, karena matahari dapat menjadi salah satu kajian dan objek ilmiah dalam pelaksanaan ibadah terkait dengan arah dan waktu. Seperti halnya awal waktu sholat, penentuan arah kiblat dan fenomena gerhana. Berdasarkan ilmu astronomi fenomena gerhana matahari maupun bulan dapat diperhitungkan dimana dan kapan terjadinya.

Mengetahui waktu terjadinya gerhana bukan termasuk ilmu ghaib (tahyyul), Syaikhul Islam ibn Taimiyah Rakhimakumullah berkata : Gerhana matahari memiliki waktu yang telah ditentukan sebagaimana munculnya hilal seperti ketetapan Allah SWT terhadap siang dan malam, musim panas dan dingin serta semua hal yang berkaitan dengan peredaran matahari dan bulan (Ali, 2007). Dan bukan karena kematian maupun kelahiran seseorang serta bukan tanda bencana. Hal ini dijelaskan dalam hadits riwayat Bukhari sebagai berikut :

إِنَّ الشَّمْسَ وَالْقَمَرَ أَيْتَانٍ مِّنْ آيَاتِ اللَّهِ لَا يُخْسِفَانِ لِمَوْتٍ أَحَدٍ وَلَا لِحَيَاةٍ فَإِذَا رَأَيْتُمْ ذَلِكَ فَادْعُوا اللَّهَ وَكَبِّرُوا وَصَلُّوا وَتَصَدَّقُوا (رواه البخاري : كتاب : الكسوف: الباب : الصدقة في الكسوف : 991)

Artinya :“Sesungguhnya (gerhana) matahari serta (gerhana) bulan, merupakan dua tanda dari berbagai tanda dari Allah. Gerhana matahari atau bulan (kejadiannya) bukan diakibatkan karena meninggalnya seseorang atau kelahiran seseorang, kalaullah kalian mendapatkan gerhana, maka segeralah berdo'a kepada Allah, agungkanlah Dia, sholat, kemudian bersedekahlah (HR.Bukhari, Kitab Kusuf, bab sedekah ketika gerhana, no. Hadits 991)

Gerhana matahari total (GMT) pada tanggal 09 Maret 2016 menjadi fenomena alam yang istimewa karena Indonesia menjadi wilayah yang dilintasi jalur GMT paling panjang sehingga penduduk di seluruh wilayah Indonesia dapat menyaksikan gerhana matahari. Tingginya minat masyarakat untuk menyaksikan peristiwa gerhana matahari menunjukkan bahwa sebagian besar masyarakat telah memiliki kepedulian terhadap ilmu astronomi. Berbeda dengan GMT pada tahun 1983 yang justru disambut dengan ketakutan. Oleh karena itu dengan adanya perubahan cara pandang masyarakat terhadap fenomena astronomi, diharapkan dapat menjadi dorongan sebagai awal perkembangan ilmu astronomi khususnya di Indonesia.

Selain dimanfaatkan sebagai momentum kebangkitan ilmu astronomi di Indonesia, GMT 09 Maret 2016 juga dimanfaatkan sebagai wisata astronomi. GMT ini memberikan dampak positif untuk memberi edukasi astronomi kepada masyarakat, sehingga tidak lagi dikaitkan dengan mitos-mitos zaman

dahulu. GMT 09 Maret 2016 dapat disaksikan di wilayah Sumatera bagian selatan, Kalimantan bagian selatan, Sulawesi barat dan Sulawesi tengah dan kepulauan Halmahera-Maluku. Adapun wilayah Indonesia lainnya mengalami gerhana matahari sebagian, seperti yang terlihat pada Gambar 1.1



Gambar 1.1 Peta Wilayah Indonesia yang dilewati GMT pada tanggal 9 Maret 2016

Penelitian tentang gerhana matahari ini penting, khususnya untuk pengembangan ilmu falak dalam memprediksi gerhana matahari yang akan terjadi berdasarkan pergerakannya serta sebagai pembelajaran ilmu astronomi kepada masyarakat. Penelitian tentang simulasi prediksi gerhana matahari masih belum banyak dilakukan khususnya di Indonesia. Pada penelitian ini, penulis akan mensimulasikan gerhana matahari total dari tahun 2016-2100 dengan menggunakan *software* matlab R2012b, sehingga dapat memprediksi gerhana matahari total 84 tahun ke depan dari tahun 2016 sampai tahun 2100.

1.2 Rumusan Penelitian

Rumusan permasalahan yang akan diselesaikan dalam penelitian ini yaitu :

1. Bagaimanakah fenomena Gerhana Matahari berdasarkan sudut pandang islam dan sains?
2. Bagaimanakah simulasi prediksi gerhana matahari total dari tahun 2016-2100 serta pada tahun berapakah gerhana matahari total melintasi wilayah Indonesia?

1.3 Batasan Penelitian

Batasan pada penelitian ini adalah :

1. Data yang digunakan bersumber dari *Elements of Solar Eclipses 1951-2200 Jean Meeus.*
2. Khusus memprediksi gerhana matahari total.
3. Simulasi prediksi gerhana matahari total dibuat dari tahun 2016-2100.

1.4 Tujuan Penelitian

Adapun tujuan penelitian ini yaitu :

1. Mengkaji fenomena Gerhana Matahari berdasarkan sudut pandang islam dan sains.
2. Memprediksi gerhana matahari total dari tahun 2016 sampai 2100 serta mengetahui gerhana matahari total yang melintasi wilayah Indonesia.

1.5 Manfaat Penelitian

Adapun manfaat dari penelitian ini bagi pecinta astrofisika, khususnya bagi penulis yaitu :

1. Dapat mengetahui fenomena Gerhana Matahari berdasarkan sudut pandang islam dan sains.
2. Dapat memprediksi gerhana matahari total dari tahun 2016 sampai 2100 serta dapat mengetahui gerhana matahari total yang melintasi wilayah Indonesia.

BAB V

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Berdasarkan hasil prediksi gerhana matahari total dan pembahasan, maka dapat diambil kesimpulan diantaranya :

1. Fenomena gerhana matahari berdasarkan sudut pandang islam dan sains merupakan salah satu dari tanda-tanda kebesaran Allah dan peringatan agar hamba-Nya lebih mendekatkan diri kepada Allah, yang terjadinya bukan karena kematian atau kelahiran seseorang maupun kemungkinan bencana yang akan terjadi. Sehingga apabila terjadi gerhana islam mengajarkan untuk segera berdzikir dan memohon ampun kepada Allah. Selain itu fenomena gerhana matahari merupakan fenomena yang dapat diperhitungkan maupun diprediksi dimana dan kapan terjadinya seperti menggunakan perhitungan algoritma Meeus.
2. Telah dibuat sebuah simulasi prediksi gerhana matahari total dari tahun 2016 sampai tahun 2100 dengan menggunakan *software* matlab. Hasil simulasi prediksi gerhana matahari memiliki selisih 0,04-0,21 detik dari prediksi NASA dengan selisih durasi totalitas rata-rata 0,12 detik. Berdasarkan beberapa hasil prediksi yang ditampilkan dan beberapa perbandingan diatas, maka dapat dikatakan bahwa hasil simulasi prediksi gerhana matahari total menggunakan *software* matlab dapat dijadikan

sebagai bahan acuan untuk informasi gerhana matahari total sampai tahun 2100 ke depan.

5.2 Saran

1. Perlu dilakukan penelitian lebih lanjut terkait pembuatan simulasi prediksi gerhana matahari yang disertakan peta dan nama wilayah.
2. Simulasi prediksi dapat dibuat menggunakan *software* lainnya, seperti misalnya menggunakan *software* Java dan Vba dan dibuat dalam bentuk aplikasi android sebagai pembelajaran atau edukasi ilmu astronomi.

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LAMPIRAN I

Elemen Bessel dari Tahun 2016-2100

Elemen Bessel tanggal 09 Maret 2016	Elemen Bessel tanggal 21 Agustus 2017	Elemen Bessel tanggal 02 Juli 2019	Elemen Bessel tanggal 14 Desember 2020
$X_0 = -0.062417$	$X_0 = -0.129588$	$X_0 = -0.215599$	$X_0 = -0.181780$
$X_1 = 0.5502769$	$X_1 = 0.5406426$	$X_1 = 0.5662087$	$X_1 = 0.5633567$
$X_2 = 0.0000047$	$X_2 = -0.0000294$	$X_2 = 0.0000274$	$X_2 = 0.0000216$
$X_3 = -0.00000906$	$X_3 = -0.00000810$	$X_3 = -0.00000879$	$X_3 = -0.00000895$
$Y_0 = 0.253690$	$Y_0 = 0.485236$	$Y_0 = -0.650886$	$Y_0 = -0.269825$
$Y_1 = 0.1721233$	$Y_1 = -0.1416400$	$Y_1 = 0.0106399$	$Y_1 = -0.0858122$
$Y_2 = 0.0000171$	$Y_2 = -0.0000905$	$Y_2 = -0.0001272$	$Y_2 = 0.0001884$
$Y_3 = -0.00000275$	$Y_3 = 0.00000205$	$Y_3 = -0.00000027$	$Y_3 = 0.00000150$
$d_0 = -4.37971$	$d_0 = 11.86696$	$d_0 = 23.01295$	$d_0 = -23.25776$
$d_1 = 0.015886$	$d_1 = -0.013622$	$d_1 = -0.003187$	$d_1 = -0.001986$
$d_2 = 0.000001$	$d_2 = -0.000002$	$d_2 = -0.000005$	$d_2 = 0.000006$
$M_0 = 207.37216$	$M_0 = 89.24543$	$M_0 = 103.97973$	$M_0 = 61.26591$
$M_1 = 15.003971$	$M_1 = 15.003938$	$M_1 = 14.999505$	$M_1 = 14.996497$
$L_{10} = 0.538861$	$L_{10} = 0.542086$	$L_{10} = 0.537624$	$L_{10} = 0.543855$
$L_{11} = -0.0000704$	$L_{11} = 0.0001241$	$L_{11} = -0.0000898$	$L_{11} = 0.0000970$
$L_{12} = -0.0000128$	$L_{12} = -0.0000118$	$L_{12} = -0.0000120$	$L_{12} = -0.0000126$
$L_{20} = -0.007227$	$L_{20} = -0.004018$	$L_{20} = -0.008457$	$L_{20} = -0.002258$
$L_{21} = -0.0000700$	$L_{21} = 0.0001234$	$L_{21} = -0.0000894$	$L_{21} = 0.0000965$
$L_{22} = -0.0000127$	$L_{22} = -0.0000117$	$L_{22} = -0.0000120$	$L_{22} = -0.0000125$
TAN $f_1 = 0.0047087$	TAN $f_1 = 0.0046222$	TAN $f_1 = 0.0045984$	TAN $f_1 = 0.0047502$
TAN $f_2 = 0.0046852$	TAN $f_2 = 0.0045992$	TAN $f_2 = 0.0045755$	TAN $f_2 = 0.0047266$
$T_0 = 2$	$T_0 = 18$	$T_0 = 19$	$T_0 = 16$

Elemen Besseel tanggal 04 Desember 2021	Elemen Bessel tanggal 08 April 2024	Elemen Bessel tanggal 12 Agustus 2026	Elemen Bessel tanggal 02 Agustus 2027
$X_0 = 0.025243$	$X_0 = -0.318120$	$X_0 = 0.475522$	$X_0 = -0.019750$
$X_1 = 0.5683028$	$X_1 = 0.5117116$	$X_1 = 0.5189249$	$X_1 = 0.5447123$
$X_2 = 0.0000391$	$X_2 = 0.0000326$	$X_2 = -0.0000773$	$X_2 = -0.0000446$
$X_3 = -0.00000966$	$X_3 = -0.00000842$	$X_3 = -0.00000804$	$X_3 = -0.00000922$
$Y_0 = -0.983838$	$Y_0 = 0.219627$	$Y_0 = 0.770993$	$Y_0 = 0.159870$
$Y_1 = -0.1315142$	$Y_1 = 0.2709589$	$Y_1 = -0.2301680$	$Y_1 = -0.2111583$
$Y_2 = 0.0002213$	$Y_2 = -0.0000595$	$Y_2 = -0.0001246$	$Y_2 = -0.0001217$
$Y_3 = 0.0000024$	$Y_3 = -0.00000466$	$Y_3 = 0.00000377$	$Y_3 = 0.00000376$
$d_0 = -22.27472$	$d_0 = 7.58620$	$d_0 = 14.79667$	$d_0 = 17.76247$
$d_1 = -0.005178$	$d_1 = 0.014844$	$d_1 = -0.012065$	$d_1 = -0.010181$
$d_2 = 0.000006$	$d_2 = -0.000002$	$d_2 = -0.000003$	$d_2 = -0.000004$
$M_0 = 302.45219$	$M_0 = 89.59122$	$M_0 = 88.74779$	$M_0 = 328.42254$
$M_1 = 14.997279$	$M_1 = 15.004083$	$M_1 = 15.003090$	$M_1 = 15.002096$
$L_{10} = 0.537798$	$L_{10} = 0.535807$	$L_{10} = 0.537948$	$L_{10} = 0.530589$
$L_{11} = -0.000016$	$L_{11} = 0.0000618$	$L_{11} = 0.0000939$	$L_{11} = 0.0000138$
$L_{12} = -0.0000131$	$L_{12} = -0.0000128$	$L_{12} = -0.0000121$	$L_{12} = -0.0000128$
$L_{20} = -0.008285$	$L_{20} = -0.010265$	$L_{20} = -0.008135$	$L_{20} = -0.015457$
$L_{21} = -0.000016$	$L_{21} = 0.0000615$	$L_{21} = 0.0000935$	$L_{21} = 0.0000137$
$L_{22} = -0.0000131$	$L_{22} = -0.0000127$	$L_{22} = -0.0000121$	$L_{22} = -0.0000128$
TAN $f_1 = 0.0047434$	TAN $f_1 = 0.0046683$	TAN $f_1 = 0.0046141$	TAN $f_1 = 0.0046064$
TAN $f_2 = 0.0047198$	TAN $f_2 = 0.0046450$	TAN $f_2 = 0.0045911$	TAN $f_2 = 0.0045834$
$T_0 = 8$	$T_0 = 18$	$T_0 = 18$	$T_0 = 10$

Elemen Bessel tanggal 22 Juli 2028	Elemen Bessel tanggal 25 November 2030	Elemen Bessel tanggal 30 Maret 2033	Elemen Bessel tanggal 20 Maret 2034
$X_0 = -0.154372$	$X_0 = 0.044200$	$X_0 = -0.318696$	$X_0 = -0.259452$
$X_1 = 0.5449892$	$X_1 = 0.5787799$	$X_1 = 0.5554245$	$X_1 = 0.5481629$
$X_2 = -0.0000214$	$X_2 = 0.0000177$	$X_2 = 0.0000227$	$X_2 = 0.0000234$
$X_3 = -0.00000869$	$X_3 = -0.00000978$	$X_3 = -0.00000942$	$X_3 = -0.00000897$
$Y_0 = -0.586615$	$Y_0 = -0.392846$	$Y_0 = 0.924538$	$Y_0 = 0.220626$
$Y_1 = -0.1746085$	$Y_1 = -0.0551891$	$Y_1 = 0.1756610$	$Y_1 = 0.1755790$
$Y_2 = -0.0001021$	$Y_2 = 0.0001744$	$Y_2 = -0.0000801$	$Y_2 = -0.0000080$
$Y_3 = 0.00000296$	$Y_3 = 0.00000083$	$Y_3 = -0.00000289$	$Y_3 = -0.00000279$
$d_0 = 20.18231$	$d_0 = -20.76100$	$d_0 = 4.09368$	$d_0 = -0.05513$
$d_1 = -0.007974$	$d_1 = -0.007989$	$d_1 = 0.015719$	$d_1 = 0.016042$
$d_2 = -0.000005$	$d_2 = 0.000005$	$d_2 = -0.000001$	$d_2 = -0.00000$
$M_0 = 223.37868$	$M_0 = 288.27459$	$M_0 = 88.92808$	$M_0 = 328.13912$
$M_1 = 15.001017$	$M_1 = 14.998361$	$M_1 = 15.004455$	$M_1 = 15.004401$
$L_{10} = 0.535230$	$L_{10} = 0.538206$	$L_{10} = 0.534936$	$L_{10} = 0.538624$
$L_{11} = -0.0000859$	$L_{11} = -0.0000379$	$L_{11} = 0.0000276$	$L_{11} = -0.0000665$
$L_{12} = -0.0000123$	$L_{12} = -0.0000130$	$L_{12} = -0.0000129$	$L_{12} = -0.0000127$
$L_{20} = -0.010840$	$L_{20} = -0.007878$	$L_{20} = -0.011132$	$L_{20} = -0.007462$
$L_{21} = -0.0000854$	$L_{21} = -0.0000377$	$L_{21} = 0.0000275$	$L_{21} = -0.0000662$
$L_{22} = -0.0000122$	$L_{22} = -0.0000130$	$L_{22} = -0.0000129$	$L_{22} = -0.0000126$
TAN $f_1 = 0.0046016$	TAN $f_1 = 0.0047361$	TAN $f_1 = 0.0046807$	TAN $f_1 = 0.0046952$
TAN $f_2 = 0.0045786$	TAN $f_2 = 0.0047125$	TAN $f_2 = 0.0046574$	TAN $f_2 = 0.0046718$
$T_0 = 3$	$T_0 = 7$	$T_0 = 18$	$T_0 = 10$

Elemen Bessel tanggal 02 September 2035	Elemen Bessel tanggal 13 Juli 2037	Elemen Bessel tanggal 26 Desember 2038	Elemen Bessel tanggal 15 Desember 2039
$X_0 = 0.134306$	$X_0 = 0.141575$	$X_0 = -0.020568$	$X_0 = -0.365886$
$X_1 = 0.5377735$	$X_1 = 0.5635996$	$X_1 = 0.5698562$	$X_1 = 0.5769287$
$X_2 = -0.0000360$	$X_2 = 0.0000001$	$X_2 = -0.0000002$	$X_2 = 0.0000473$
$X_3 = -0.00000812$	$X_3 = -0.00000869$	$X_3 = -0.00000912$	$X_3 = -0.00000981$
$Y_0 = 0.348813$	$Y_0 = -0.733892$	$Y_0 = -0.287568$	$Y_0 = -0.902298$
$Y_1 = -0.1584651$	$Y_1 = -0.0318218$	$Y_1 = -0.0379711$	$Y_1 = -0.0849487$
$Y_2 = -0.0000595$	$Y_2 = -0.0001131$	$Y_2 = 0.0001915$	$Y_2 = 0.0002295$
$Y_3 = 0.00000232$	$Y_3 = 0.00000041$	$Y_3 = 0.00000073$	$Y_3 = 0.00000160$
$d_0 = 8.01771$	$d_0 = 21.78243$	$d_0 = -23.36258$	$d_0 = -23.27405$
$d_1 = -0.014783$	$d_1 = -0.006046$	$d_1 = 0.001481$	$d_1 = -0.001862$
$d_2 = -0.000002$	$d_2 = -0.000005$	$d_2 = 0.000006$	$d_2 = 0.000006$
$M_0 = 210.02999$	$M_0 = 223.55013$	$M_0 = 194.92213$	$M_0 = 61.22590$
$M_1 = 15.004641$	$M_1 = 15.000224$	$M_1 = 14.996374$	$M_1 = 14.9966522$
$L_{10} = 0.541913$	$L_{10} = 0.538376$	$L_{10} = 0.543500$	$L_{10} = 0.538200$
$L_{11} = 0.0001103$	$L_{11} = -0.0001101$	$L_{11} = 0.0000867$	$L_{11} = -0.0000004$
$L_{12} = -0.0000119$	$L_{12} = -0.0000120$	$L_{12} = -0.0000126$	$L_{12} = -0.0000131$
$L_{20} = -0.004190$	$L_{20} = -0.007709$	$L_{20} = -0.002610$	$L_{20} = -0.007885$
$L_{21} = 0.0001098$	$L_{21} = -0.0001096$	$L_{21} = 0.0000863$	$L_{21} = -0.0000004$
$L_{22} = -0.0000118$	$L_{22} = -0.0000119$	$L_{22} = -0.0000126$	$L_{22} = -0.0000131$
TAN $f_1 = 0.0046328$	TAN $f_1 = 0.0045993$	TAN $f_1 = 0.0047537$	TAN $f_1 = 0.0047499$
TAN $f_2 = 0.0046097$	TAN $f_2 = 0.0045764$	TAN $f_2 = 0.0047300$	TAN $f_2 = 0.0047262$
$T_0 = 2$	$T_0 = 3$	$T_0 = 1$	$T_0 = 16$

Elemen Bessel tanggal 30 April 2041	Elemen Bessel tanggal 20 April 2042	Elemen Bessel tanggal 23 Agustus 2044	Elemen Bessel tanggal 12 Agustus 2045
$X_0 = 0.246590$	$X_0 = -0.282156$	$X_0 = 0.279569$	$X_0 = 0.240734$
$X_1 = 0.5066721$	$X_1 = 0.5204320$	$X_1 = 0.5107779$	$X_1 = 0.5332199$
$X_2 = 0.0000112$	$X_2 = 0.0000418$	$X_2 = -0.0000610$	$X_2 = -0.0000535$
$X_3 = -0.00000731$	$X_3 = -0.00000861$	$X_3 = -0.00000797$	$X_3 = -0.00000902$
$Y_0 = -0.382274$	$Y_0 = 0.190376$	$Y_0 = 0.933625$	$Y_0 = 0.123877$
$Y_1 = 0.2242315$	$Y_1 = 0.2561881$	$Y_1 = -0.2512821$	$Y_1 = -0.2388144$
$Y_2 = -0.0000740$	$Y_2 = -0.0000819$	$Y_2 = -0.0001094$	$Y_2 = -0.0000966$
$Y_3 = -0.00000342$	$Y_3 = -0.00000444$	$Y_3 = 0.00000413$	$Y_3 = 0.00000423$
$d_0 = 14.97447$	$d_0 = 11.51744$	$d_0 = 11.26904$	$d_0 = 14.67394$
$d_1 = 0.012128$	$d_1 = 0.013670$	$d_1 = -0.013582$	$d_1 = -0.012107$
$d_2 = -0.000003$	$d_2 = -0.000003$	$d_2 = -0.000002$	$d_2 = -0.000003$
$M_0 = 0.70737$	$M_0 = 210.25866$	$M_0 = 194.34898$	$M_0 = 88.76048$
$M_1 = 15.002539$	$M_1 = 15.003454$	$M_1 = 15.004007$	$M_1 = 15.003169$
$L_{10} = 0.545200$	$L_{10} = 0.534676$	$L_{10} = 0.537683$	$L_{10} = 0.530936$
$L_{11} = 0.0001104$	$L_{11} = 0.0000561$	$L_{11} = 0.0001028$	$L_{11} = -0.0000029$
$L_{12} = -0.0000116$	$L_{12} = -0.0000128$	$L_{12} = -0.0000122$	$L_{12} = -0.0000129$
$L_{20} = -0.000919$	$L_{20} = -0.011391$	$L_{20} = -0.008399$	$L_{20} = -0.015112$
$L_{21} = 0.0001099$	$L_{21} = 0.0000558$	$L_{21} = 0.0001023$	$L_{21} = -0.0000029$
$L_{22} = -0.0000116$	$L_{22} = -0.0000127$	$L_{22} = -0.0000122$	$L_{22} = -0.0000128$
TAN $f_1 = 0.0046415$	TAN $f_1 = 0.0046543$	TAN $f_1 = 0.0046232$	TAN $f_1 = 0.0046137$
TAN $f_2 = 0.0046184$	TAN $f_2 = 0.0046311$	TAN $f_2 = 0.0046001$	TAN $f_2 = 0.0045908$
$T_0 = 12$	$T_0 = 2$	$T_0 = 1$	$T_0 = 18$

Elemen Bessel tanggal 2 Agustus 2046	Elemen Bessel tanggal 5 Desember 2048	Elemen Bessel tanggal 30 Maret 2052	Elemen Bessel tanggal 12 September 2053
$X_0 = -0.382108$	$X_0 = 0.230330$	$X_0 = 0.160389$	$X_0 = 0.325331$
$X_1 = 0.5318330$	$X_1 = 0.5806540$	$X_1 = 0.5483147$	$X_1 = 0.5364330$
$X_2 = -0.0000108$	$X_2 = -0.0000024$	$X_2 = 0.0000117$	$X_2 = -0.0000375$
$X_3 = -0.00000838$	$X_3 = -0.00000978$	$X_3 = -0.00000893$	$X_3 = -0.00000817$
$Y_0 = -0.425511$	$Y_0 = -0.401813$	$Y_0 = 0.389416$	$Y_0 = 0.226670$
$Y_1 = -0.2069787$	$Y_1 = -0.0107019$	$Y_1 = 0.1717027$	$Y_1 = -0.1685794$
$Y_2 = -0.0000898$	$Y_2 = 0.0001924$	$Y_2 = -0.0000423$	$Y_2 = -0.0000291$
$Y_3 = 0.00000345$	$Y_3 = 0.00000007$	$Y_3 = -0.00000272$	$Y_3 = 0.00000249$
$d_0 = 17.65568$	$d_0 = -22.49575$	$d_0 = 4.26382$	$d_0 = 3.91319$
$d_1 = -0.010271$	$d_1 = -0.004931$	$d_1 = 0.015707$	$d_1 = -0.015512$
$d_2 = -0.000004$	$d_2 = 0.000006$	$d_2 = -0.000001$	$d_2 = -0.000001$
$M_0 = 328.41596$	$M_0 = 62.27963$	$M_0 = 103.96399$	$M_0 = 330.96356$
$M_1 = 15.002112$	$M_1 = 14.997149$	$M_1 = 15.004423$	$M_1 = 15.004990$
$L_{10} = 0.536204$	$L_{10} = 0.538893$	$L_{10} = 0.538291$	$L_{10} = 0.541857$
$L_{11} = -0.0000798$	$L_{11} = -0.0000506$	$L_{11} = -0.0000908$	$L_{11} = 0.0000990$
$L_{12} = -0.0000122$	$L_{12} = -0.0000130$	$L_{12} = -0.0000126$	$L_{12} = -0.0000120$
$L_{20} = -0.009870$	$L_{20} = -0.007195$	$L_{20} = -0.007794$	$L_{20} = -0.004245$
$L_{21} = -0.0000794$	$L_{21} = -0.0000503$	$L_{21} = -0.0000903$	$L_{21} = 0.0000985$
$L_{22} = -0.0000122$	$L_{22} = -0.0000130$	$L_{22} = -0.0000125$	$L_{22} = -0.0000119$
TAN $f_1 = 0.0046066$	TAN $f_1 = 0.0047445$	TAN $f_1 = 0.0046807$	TAN $f_1 = 0.0046454$
TAN $f_2 = 0.0045836$	TAN $f_2 = 0.0047209$	TAN $f_2 = 0.0046574$	TAN $f_2 = 0.0046223$
$T_0 = 10$	$T_0 = 16$	$T_0 = 19$	$T_0 = 10$

Elemen Bessel tanggal 24 Juli 2055	Elemen Bessel tanggal 05 Januari 2057	Elemen Bessel tanggal 26 Desember 2057	Elemen Bessel tanggal 11 Mei 2059
	$X_0 = 0.120543$	$X_0 = -0.198956$	
$X_0 = -0.079351$	$X_1 = 0.5722665$	$X_1 = 0.5818051$	$X_0 = -0.011920$
$X_1 = 0.5582301$	$X_2 = -0.0000209$	$X_2 = 0.0000241$	$X_1 = 0.5197702$
$X_2 = 0.0000028$	$X_3 = -0.00000922$	$X_3 = -0.00000990$	$X_2 = 0.0000258$
$X_3 = -0.00000852$	$Y_0 = -0.281932$	$Y_0 = -0.930198$	$X_3 = -0.00000761$
$Y_0 = -0.797697$	$Y_1 = 0.0094215$	$Y_1 = -0.0358837$	$Y_0 = -0.548247$
$Y_1 = -0.0699515$	$Y_2 = 0.0001831$	$Y_2 = 0.0002335$	$Y_1 = 0.1978978$
$Y_2 = -0.0000936$	$Y_3 = -0.00000005$	$Y_3 = 0.00000075$	$Y_2 = -0.0000880$
$Y_3 = 0.00000099$	$d_0 = -22.52547$	$d_0 = -23.34527$	$Y_3 = -0.00000307$
$d_0 = 19.81362$	$d_1 = 0.004876$	$d_1 = 0.001602$	$d_0 = 18.03314$
$d_1 = -0.008628$	$d_2 = 0.000006$	$d_2 = 0.000006$	$d_1 = 0.010098$
$d_2 = -0.000005$	$M_0 = 328.63068$	$M_0 = 194.88423$	$d_2 = -0.000004$
$M_0 = 328.34844$	$M_1 = 14.996917$	$M_1 = 14.996418$	$M_0 = 105.89467$
$M_1 = 15.001232$	$L_{10} = 0.543036$	$L_{10} = 0.538479$	$M_1 = 15.001516$
$L_{10} = 0.539364$	$L_{11} = 0.0000770$	$L_{11} = -0.0000104$	$L_{10} = 0.543597$
$L_{11} = -0.0001059$	$L_{12} = -0.0000127$	$L_{12} = -0.0000131$	$L_{11} = 0.0001205$
$L_{12} = -0.0000119$	$L_{20} = -0.003072$	$L_{20} = -0.007606$	$L_{12} = -0.0000117$
$L_{20} = -0.006726$	$L_{21} = 0.0000766$	$L_{21} = -0.0000103$	$L_{20} = -0.002514$
$L_{21} = -0.0001054$	$L_{22} = -0.0000126$	$L_{22} = -0.0000131$	$L_{21} = 0.0001199$
$L_{22} = -0.0000118$	$TAN f_1 = 0.0047548$	$TAN f_1 = 0.0047534$	$L_{22} = -0.0000116$
$TAN f_1 = 0.0046021$	$TAN f_2 = 0.0047312$	$TAN f_2 = 0.0047298$	$TAN f_1 = 0.0046298$
$TAN f_2 = 0.0045792$	$T_0 = 10$	$T_0 = 1$	$TAN f_2 = 0.0046067$
$T_0 = 10$			$T_0 = 19$

Elemen Bessel tanggal 30 April 2060	Elemen Bessel tanggal 20 April 2061	Elemen Bessel tanggal 24 Agustus 2063	Elemen Bessel tanggal 12 Agustus 2064
$X_0 = -0.186085$	$X_0 = -0.391919$	$X_0 = -0.070033$	$X_0 = -0.070226$
$X_1 = 0.5315517$	$X_1 = 0.5207760$	$X_1 = 0.5232786$	$X_1 = 0.5190735$
$X_2 = 0.0000450$	$X_2 = 0.0000643$	$X_2 = -0.0000295$	$X_2 = -0.0000214$
$X_3 = -0.00000885$	$X_3 = -0.00000858$	$X_3 = -0.00000884$	$X_3 = -0.00000811$
$Y_0 = 0.182376$	$Y_0 = 0.874241$	$Y_0 = 0.343976$	$Y_0 = -0.478623$
$Y_1 = 0.2346059$	$Y_1 = 0.2539408$	$Y_1 = -0.2596770$	$Y_1 = -0.2331515$
$Y_2 = -0.0001054$	$Y_2 = -0.0001155$	$Y_2 = -0.0000847$	$Y_2 = -0.0000651$
$Y_3 = -0.00000410$	$Y_3 = -0.00000439$	$Y_3 = 0.00000458$	$Y_3 = 0.00000383$
$d_0 = 15.06878$	$d_0 = 11.66528$	$d_0 = 11.13078$	$d_0 = 14.55016$
$d_1 = 0.012049$	$d_1 = 0.013618$	$d_1 = -0.013609$	$d_1 = -0.012183$
$d_2 = -0.000003$	$d_2 = -0.000002$	$d_2 = -0.000002$	$d_2 = -0.000003$
$M_0 = 330.71164$	$M_0 = 225.28180$	$M_0 = 194.36823$	$M_0 = 88.77208$
$M_1 = 15.002564$	$M_1 = 15.003417$	$M_1 = 15.004072$	$M_1 = 15.003177$
$L_{10} = 0.533634$	$L_{10} = 0.534966$	$L_{10} = 0.531431$	$L_{10} = 0.537259$
$L_{11} = 0.0000474$	$L_{11} = -0.0000602$	$L_{11} = 0.0000081$	$L_{11} = -0.0000978$
$L_{12} = -0.0000128$	$L_{12} = -0.0000127$	$L_{12} = -0.0000129$	$L_{12} = -0.0000122$
$L_{20} = -0.012427$	$L_{20} = -0.011102$	$L_{20} = -0.014620$	$L_{20} = -0.008820$
$L_{21} = 0.0000472$	$L_{21} = -0.0000599$	$L_{21} = 0.0000081$	$L_{21} = -0.0000973$
$L_{22} = -0.0000127$	$L_{22} = -0.0000127$	$L_{22} = -0.0000128$	$L_{22} = -0.0000121$
TAN $f_1 = 0.0046411$	TAN $f_1 = 0.0046541$	TAN $f_1 = 0.0046230$	TAN $f_1 = 0.0046141$
TAN $f_2 = 0.0046180$	TAN $f_2 = 0.0046309$	TAN $f_2 = 0.0046000$	TAN $f_2 = 0.0045911$
$T_0 = 10$	$T_0 = 3$	$T_0 = 1$	$T_0 = 18$

Elemen Bessel tanggal 17 Desember 2066	Elemen Bessel tanggal 31 Mei 2068	Elemen Bessel tanggal 11 April 2070	Elemen Bessel tanggal 23 September 2071
$X_0 = -0.202269$		$X_0 = 0.116648$	$X_0 = -0.103171$
$X_1 = 0.5788602$	$X_0 = 0.066432$	$X_1 = 0.5504562$	$X_1 = 0.5370933$
$X_2 = 0.0000054$	$X_1 = 0.5481974$	$X_2 = 0.0000216$	$X_2 = -0.0000096$
$X_3 = -0.00000970$	$X_2 = -0.0000134$	$X_3 = -0.00000891$	$X_3 = -0.00000827$
$Y_0 = -0.418202$	$X_3 = -0.00000777$	$Y_0 = 0.414392$	$Y_0 = 0.307921$
$Y_1 = 0.0368780$	$Y_0 = -0.795036$	$Y_1 = 0.1607142$	$Y_1 = -0.1718955$
$Y_2 = 0.0002023$	$Y_1 = 0.0244838$	$Y_2 = -0.0000696$	$Y_2 = -0.0000075$
$Y_3 = -0.00000074$	$Y_2 = -0.0001118$	$Y_3 = -0.00000252$	$Y_3 = 0.00000257$
$d_0 = -23.34729$	$Y_3 = -0.00000027$	$d_0 = 8.41019$	$d_0 = -0.31420$
$d_1 = -0.001582$	$d_0 = 22.02278$	$d_1 = 0.014903$	$d_1 = -0.015794$
$d_2 = 0.000006$	$d_1 = 0.005644$	$d_2 = -0.000002$	$d_2 = -0.000000$
$M_0 = 181.02414$	$d_2 = -0.000005$	$M_0 = 224.73706$	$M_0 = 76.93185$
$M_1 = 14.996462$	$M_0 = 240.53245$	$M_1 = 15.004049$	$M_1 = 15.004953$
$L_{10} = 0.539535$	$M_1 = 14.999823$	$L_{10} = 0.538080$	$L_{10} = 0.541746$
$L_{11} = -0.0000352$	$L_{10} = 0.545935$	$L_{11} = -0.0000932$	$L_{11} = 0.0001150$
$L_{12} = -0.0000130$	$L_{11} = 0.0001158$	$L_{12} = -0.0000125$	$L_{12} = -0.0000121$
$L_{20} = -0.006556$	$L_{12} = -0.0000113$	$L_{20} = -0.008004$	$L_{20} = -0.004355$
$L_{21} = -0.0000351$	$L_{20} = -0.000187$	$L_{21} = -0.0000928$	$L_{21} = 0.0001144$
$L_{22} = -0.0000129$	$L_{21} = 0.0001152$	$L_{22} = -0.0000124$	$L_{22} = -0.0000120$
TAN $f_1 = 0.0047506$	$L_{22} = -0.0000113$	TAN $f_1 = 0.0046667$	TAN $f_1 = 0.0046586$
TAN $f_2 = 0.0047270$	TAN $f_1 = 0.0046118$	TAN $f_2 = 0.0046434$	TAN $f_2 = 0.0046354$
$T_0 = 0$	$T_0 = 0.0045888$	$T_0 = 3$	$T_0 = 17$
	$T_0 = 4$		

Elemen Bessel tanggal 12 September 2072	Elemen Bessel tanggal 03 Agustus 2073	Elemen Bessel tanggal 16 Januari 2075	Elemen Bessel tanggal 06 Januari 2076
$X_0 = 0.297960$	$X_0 = -0.301506$	$X_0 = 0.254145$	$X_0 = -0.052071$
$X_1 = 0.5561905$	$X_1 = 0.5511557$	$X_1 = 0.5710232$	$X_1 = 0.5824669$
$X_2 = -0.0000275$	$X_2 = 0.0000093$	$X_2 = -0.0000383$	$X_2 = 0.0000022$
$X_3 = -0.00000947$	$X_3 = -0.00000832$	$X_3 = -0.00000926$	$X_3 = -0.00000990$
$Y_0 = 0.918228$	$Y_0 = -0.835370$	$Y_0 = -0.257440$	$Y_0 = -0.938806$
$Y_1 = -0.1762265$	$Y_1 = -0.1026031$	$Y_1 = 0.0536085$	$Y_1 = 0.0123864$
$Y_2 = -0.0000746$	$Y_2 = -0.0000713$	$Y_2 = 0.0001646$	$Y_2 = 0.0002259$
$Y_3 = 0.00000292$	$Y_3 = 0.00000148$	$Y_3 = -0.00000078$	$Y_3 = -0.00000009$
$d_0 = 3.77284$	$d_0 = 17.18994$	$d_0 = -20.79370$	$d_0 = -22.47513$
$d_1 = -0.015506$	$d_1 = -0.010861$	$d_1 = 0.007995$	$d_1 = 0.004989$
$d_2 = -0.000001$	$d_2 = -0.000004$	$d_2 = 0.000005$	$d_2 = 0.000006$
$M_0 = 315.99016$	$M_0 = 73.44228$	$M_0 = 102.56072$	$M_0 = 328.59516$
$M_1 = 15.005050$	$M_1 = 15.002341$	$M_1 = 14.998014$	$M_1 = 14.996977$
$L_{10} = 0.532790$	$L_{10} = 0.540537$	$L_{10} = 0.542428$	$L_{10} = 0.538660$
$L_{11} = 0.0000217$	$L_{11} = -0.0001013$	$L_{11} = 0.0000674$	$L_{11} = -0.0000193$
$L_{12} = -0.0000129$	$L_{12} = -0.0000118$	$L_{12} = -0.0000127$	$L_{12} = -0.0000131$
$L_{20} = -0.013267$	$L_{20} = -0.005559$	$L_{20} = -0.003677$	$L_{20} = -0.007427$
$L_{21} = 0.0000216$	$L_{21} = -0.0001008$	$L_{21} = 0.0000670$	$L_{21} = -0.0000192$
$L_{22} = -0.0000128$	$L_{22} = -0.0000118$	$L_{22} = -0.0000127$	$L_{22} = -0.0000131$
TAN $f_1 = 0.0046450$	TAN $f_1 = 0.0046078$	TAN $f_1 = 0.0047529$	TAN $f_1 = 0.0047545$
TAN $f_2 = 0.0046218$	TAN $f_2 = 0.0045849$	TAN $f_2 = 0.0047292$	TAN $f_2 = 0.0047309$
$T_0 = 9$	$T_0 = 17$	$T_0 = 19$	$T_0 = 10$

Elemen Bessel tanggal 22 Mei 2077	Elemen Bessel tanggal 11 Mei 2078	Elemen Bessel tanggal 01 Mei 2079	Elemen Bessel tanggal 03 September 2081
$X_0 = 0.293438$	$X_0 = -0.036825$	$X_0 = -0.276489$	$X_0 = 0.094263$
$X_1 = 0.5331974$	$X_1 = 0.5440809$	$X_1 = 0.5302500$	$X_1 = 0.5156432$
$X_2 = 0.0000110$	$X_2 = 0.0000413$	$X_2 = 0.0000660$	$X_2 = -0.0000268$
$X_3 = -0.00000789$	$X_3 = -0.00000911$	$X_3 = -0.00000871$	$X_3 = -0.00000869$
$Y_0 = -0.508578$	$Y_0 = 0.182408$	$Y_0 = 0.869939$	$Y_0 = 0.332318$
$Y_1 = 0.1652241$	$Y_1 = 0.2062585$	$Y_1 = 0.2314249$	$Y_1 = -0.2740714$
$Y_2 = -0.0001093$	$Y_2 = -0.0001286$	$Y_2 = -0.0001394$	$Y_2 = -0.0000606$
$Y_3 = -0.00000261$	$Y_3 = -0.00000363$	$Y_3 = -0.00000400$	$Y_3 = 0.00000482$
$d_0 = 20.49352$	$d_0 = 18.12168$	$d_0 = 15.20186$	$d_0 = 7.22193$
$d_1 = 0.007674$	$d_1 = 0.010001$	$d_1 = 0.011980$	$d_1 = -0.014687$
$d_2 = -0.000005$	$d_2 = -0.000004$	$d_2 = -0.000003$	$d_2 = -0.000002$
$M_0 = 225.80885$	$M_0 = 90.88991$	$M_0 = 345.71424$	$M_0 = 315.18861$
$M_1 = 15.000511$	$M_1 = 15.001536$	$M_1 = 15.002513$	$M_1 = 15.004698$
$L_{10} = 0.542202$	$L_{10} = 0.532699$	$L_{10} = 0.534678$	$L_{10} = 0.532066$
$L_{11} = 0.0001046$	$L_{11} = 0.0000363$	$L_{11} = -0.0000680$	$L_{11} = -0.0000041$
$L_{12} = -0.0000117$	$L_{12} = -0.0000128$	$L_{12} = -0.0000127$	$L_{12} = -0.0000129$
$L_{20} = -0.003902$	$L_{20} = -0.013357$	$L_{20} = -0.011389$	$L_{20} = -0.013988$
$L_{21} = 0.0001041$	$L_{21} = 0.0000361$	$L_{21} = -0.0000677$	$L_{21} = -0.0000041$
$L_{22} = -0.0000117$	$L_{22} = -0.0000127$	$L_{22} = -0.0000126$	$L_{22} = -0.0000128$
TAN $f_1 = 0.0046192$	TAN $f_1 = 0.0046292$	TAN $f_1 = 0.0046410$	TAN $f_1 = 0.0046341$
TAN $f_2 = 0.0045962$	TAN $f_2 = 0.0046061$	TAN $f_2 = 0.0046179$	TAN $f_2 = 0.0046110$
$T_0 = 3$	$T_0 = 18$	$T_0 = 11$	$T_0 = 9$

Elemen Bessel tanggal 24 Agustus 2082	Elemen Bessel tanggal 27 Desember 2084	Elemen Bessel tanggal 11 Juni 2086	Elemen Bessel tanggal 21 April 2088
$X_0 = -0.316454$	$X_0 = -0.070870$	$X_0 = -0.088581$	$X_0 = 0.157435$
$X_1 = 0.5078963$	$X_1 = 0.5729242$	$X_1 = 0.5506569$	$X_1 = 0.5541417$
$X_2 = -0.0000021$	$X_2 = -0.0000155$	$X_2 = -0.0000180$	$X_2 = 0.0000252$
$X_3 = -0.00000784$	$X_3 = -0.00000955$	$X_3 = -0.00000790$	$X_3 = -0.00000891$
$Y_0 = -0.289915$	$Y_0 = -0.424763$	$Y_0 = -0.719249$	$Y_0 = 0.467406$
$Y_1 = -0.2526639$	$Y_1 = 0.0855706$	$Y_1 = -0.0172014$	$Y_1 = 0.1426971$
$Y_2 = -0.0000517$	$Y_2 = 0.0002007$	$Y_2 = -0.0001237$	$Y_2 = -0.0000980$
$Y_3 = 0.00000410$	$Y_3 = -0.00000157$	$Y_3 = 0.00000034$	$Y_3 = -0.00000222$
$d_0 = 10.98988$	$d_0 = -23.26555$	$d_0 = 23.12593$	$d_0 = 12.27414$
$d_1 = -0.013671$	$d_1 = 0.001886$	$d_1 = 0.002725$	$d_1 = 0.013637$
$d_2 = -0.000002$	$d_2 = 0.000006$	$d_2 = -0.000006$	$d_2 = -0.000003$
$M_0 = 194.38231$	$M_0 = 314.67560$	$M_0 = 345.02404$	$M_0 = 345.36243$
$M_1 = 15.004071$	$M_1 = 14.996441$	$M_1 = 14.999268$	$M_1 = 15.003351$
$L_{10} = 0.538537$	$L_{10} = 0.540011$	$L_{10} = 0.544621$	$L_{10} = 0.537888$
$L_{11} = -0.0000890$	$L_{11} = -0.0000450$	$L_{11} = 0.0001193$	$L_{11} = -0.0000991$
$L_{12} = -0.0000121$	$L_{12} = -0.0000130$	$L_{12} = -0.0000114$	$L_{12} = -0.0000124$
$L_{20} = -0.007549$	$L_{20} = -0.006082$	$L_{20} = -0.001495$	$L_{20} = -0.008195$
$L_{21} = -0.0000886$	$L_{21} = -0.0000448$	$L_{21} = 0.0001187$	$L_{21} = -0.0000986$
$L_{22} = -0.0000121$	$L_{22} = -0.0000129$	$L_{22} = -0.0000114$	$L_{22} = -0.0000124$
TAN $f_1 = 0.0046233$	TAN $f_1 = 0.0047538$	TAN $f_1 = 0.0046053$	TAN $f_1 = 0.0046525$
TAN $f_2 = 0.0046003$	TAN $f_2 = 0.0047301$	TAN $f_2 = 0.0045824$	TAN $f_2 = 0.0046294$
$T_0 = 1$	$T_0 = 9$	$T_0 = 11$	$T_0 = 11$

Elemen Bessel tanggal 04 Oktober 2089	Elemen Bessel tanggal 23 September 2090	Elemen Bessel tanggal 15 Agustus 2091	Elemen Bessel tanggal 27 Januari 2093
$X_0 = -0.073637$	$X_0 = 0.312438$	$X_0 = 0.010143$	$X_0 = -0.166192$
$X_1 = 0.5398158$	$X_1 = 0.5554707$	$X_1 = 0.5435230$	$X_1 = 0.5672931$
$X_2 = -0.0000026$	$X_2 = -0.0000192$	$X_2 = -0.0000044$	$X_2 = -0.0000237$
$X_3 = -0.00000838$	$X_3 = -0.00000946$	$X_3 = -0.00000813$	$X_3 = -0.00000927$
$Y_0 = 0.249775$	$Y_0 = 0.861191$	$Y_0 = -0.977951$	$Y_0 = -0.304460$
$Y_1 = -0.1683441$	$Y_1 = -0.1789025$	$Y_1 = -0.1290791$	$Y_1 = 0.0920882$
$Y_2 = 0.0000206$	$Y_2 = -0.0000459$	$Y_2 = -0.0000422$	$Y_2 = 0.0001430$
$Y_3 = 0.00000254$	$Y_3 = 0.00000297$	$Y_3 = -0.00000187$	$Y_3 = -0.00000142$
$d_0 = -4.57125$	$d_0 = -0.47153$	$d_0 = 14.00129$	$d_0 = -18.27780$
$d_1 = -0.015620$	$d_1 = -0.015774$	$d_1 = -0.012701$	$d_1 = 0.010671$
$d_2 = 0.000001$	$d_2 = 0.000000$	$d_2 = -0.000003$	$d_2 = 0.000004$
$M_0 = 197.83991$	$M_0 = 76.96498$	$M_0 = 193.84064$	$M_0 = 221.84154$
$M_1 = 15.004499$	$M_1 = 15.004994$	$M_1 = 15.003407$	$M_1 = 14.999430$
$L_{10} = 0.541814$	$L_{10} = 0.533385$	$L_{10} = 0.541714$	$L_{10} = 0.541633$
$L_{11} = 0.0001101$	$L_{11} = 0.0000147$	$L_{11} = -0.0001194$	$L_{11} = 0.0000822$
$L_{12} = -0.0000122$	$L_{12} = -0.0000129$	$L_{12} = -0.0000118$	$L_{12} = -0.0000128$
$L_{20} = -0.004289$	$L_{20} = -0.012675$	$L_{20} = -0.004388$	$L_{20} = -0.004469$
$L_{21} = 0.0001095$	$L_{21} = 0.0000147$	$L_{21} = -0.0001188$	$L_{21} = 0.0000818$
$L_{22} = -0.0000121$	$L_{22} = -0.0000129$	$L_{22} = -0.0000117$	$L_{22} = -0.0000127$
TAN $f_1 = 0.0046728$	TAN $f_1 = 0.0046583$	TAN $f_1 = 0.0046152$	TAN $f_1 = 0.0047483$
TAN $f_2 = 0.0046495$	TAN $f_2 = 0.0046351$	TAN $f_2 = 0.0045922$	TAN $f_2 = 0.0047246$
$T_0 = 1$	$T_0 = 17$	$T_0 = 1$	$T_0 = 3$

Elemen Bessel tanggal 16 Januari 2094	Elemen Bessel tanggal 02 Juni 2095	Elemen Bessel tanggal 22 Mei 2096	Elemen Bessel tanggal 11 Mei 2097
$X_0 = 0.100926$	$X_0 = 0.076058$	$X_0 = 0.176430$	$X_0 = -0.068446$
$X_1 = 0.5794222$	$X_1 = 0.5455676$	$X_1 = 0.5567474$	$X_1 = 0.5409653$
$X_2 = -0.0000168$	$X_2 = 0.0000148$	$X_2 = 0.0000294$	$X_2 = 0.0000589$
$X_3 = -0.00000983$	$X_3 = -0.00000819$	$X_3 = -0.00000937$	$X_3 = -0.00000886$
$Y_0 = -0.928076$	$Y_0 = -0.639220$	$Y_0 = 0.179346$	$Y_0 = 0.883427$
$Y_1 = 0.0570106$	$Y_1 = 0.1273288$	$Y_1 = 0.1715819$	$Y_1 = 0.2023789$
$Y_2 = 0.0002081$	$Y_2 = -0.0001184$	$Y_2 = -0.0001492$	$Y_2 = -0.0001634$
$Y_3 = -0.00000086$	$Y_3 = -0.00000207$	$Y_3 = -0.00000305$	$Y_3 = -0.00000350$
$d_0 = -20.71500$	$d_0 = 22.24582$	$d_0 = 20.56046$	$d_0 = 18.22874$
$d_1 = 0.008090$	$d_1 = 0.004941$	$d_1 = 0.007570$	$d_1 = 0.009918$
$d_2 = 0.000005$	$d_2 = -0.000005$	$d_2 = -0.000005$	$d_2 = -0.000004$
$M_0 = 102.54384$	$M_0 = 330.45398$	$M_0 = 210.79228$	$M_0 = 105.89085$
$M_1 = 14.998082$	$M_1 = 14.999693$	$M_1 = 15.000532$	$M_1 = 15.001479$
$L_{10} = 0.538712$	$L_{10} = 0.540843$	$L_{10} = 0.531888$	$L_{10} = 0.534490$
$L_{11} = -0.0000288$	$L_{11} = 0.0001110$	$L_{11} = 0.0000222$	$L_{11} = -0.0000795$
$L_{12} = -0.0000131$	$L_{12} = -0.0000118$	$L_{12} = -0.0000128$	$L_{12} = -0.0000126$
$L_{20} = -0.007375$	$L_{20} = -0.005254$	$L_{20} = -0.014165$	$L_{20} = -0.011576$
$L_{21} = -0.0000287$	$L_{21} = 0.0001104$	$L_{21} = 0.0000221$	$L_{21} = -0.0000791$
$L_{22} = -0.0000130$	$L_{22} = -0.0000118$	$L_{22} = -0.0000127$	$L_{22} = -0.0000125$
TAN $f_1 = 0.0047526$	TAN $f_1 = 0.0046109$	TAN $f_1 = 0.0046188$	TAN $f_1 = 0.0046292$
TAN $f_2 = 0.0047289$	TAN $f_2 = 0.0045879$	TAN $f_2 = 0.0045958$	TAN $f_2 = 0.0046062$
$T_0 = 19$	$T_0 = 10$	$T_0 = 2$	$T_0 = 19$

Elemen Bessel tanggal 14 September 2099	Elemen Bessel tanggal 04 September 2100
$X_0 = 0.208738$	$X_0 = -0.69995$
$X_1 = 0.5110425$	$X_1 = 0.4991349$
$X_2 = -0.0000197$	$X_2 = -0.0000030$
$X_3 = -0.00000860$	$X_3 = -0.00000763$
$Y_0 = 0.334880$	$Y_0 = -0.346284$
$Y_1 = -0.2818505$	$Y_1 = -0.2657267$
$Y_2 = -0.0000374$	$Y_2 = -0.0000265$
$Y_3 = 0.00000495$	$Y_3 = 0.00000427$
$d_0 = 3.08305$	$d_0 = 7.07443$
$d_1 = -0.015328$	$d_1 = -0.014736$
$d_2 = -0.000001$	$d_2 = -0.000002$
$M_0 = 76.14336$	$M_0 = 315.21890$
$M_1 = 15.004968$	$M_1 = 15.004678$
$L_{10} = 0.532822$	$L_{10} = 0.539866$
$L_{11} = -0.0000141$	$L_{11} = -0.0001031$
$L_{12} = -0.0000129$	$L_{12} = -0.0000121$
$L_{20} = -0.013236$	$L_{20} = -0.006226$
$L_{21} = -0.0000141$	$L_{21} = -0.0001026$
$L_{22} = -0.0000128$	$L_{22} = -0.0000120$
$\text{TAN } f_1 = 0.0046466$	$\text{TAN } f_1 = 0.0046346$
$\text{TAN } f_2 = 0.0046235$	$\text{TAN } f_2 = 0.0046116$
$T_0 = 17$	$T_0 = 9$

LAMPIRAN II

A. Input Data Prediksi Gerhana Matahari Total dari Tahun 2016-2100 Menggunakan Software Matlab

```
function varargout = gerhanaupdate(varargin)
% GERHANAUPDATE MATLAB code for gerhanaupdate.fig
%   GERHANAUPDATE, by itself, creates a new GERHANAUPDATE or
% raises the existing
%   singleton*.
%
%   H = GERHANAUPDATE returns the handle to a new GERHANAUPDATE
% or the handle to
%   the existing singleton*.
%
%   GERHANAUPDATE('CALLBACK', hObject, eventData, handles,...)
calls the local
%   function named CALLBACK in GERHANAUPDATE.M with the given
input arguments.
%
%   GERHANAUPDATE('Property','Value',...) creates a new
GERHANAUPDATE or raises the
%   existing singleton*. Starting from the left, property
value pairs are
%   applied to the GUI before gerhanaupdate_OpeningFcn gets
called. An
%   unrecognized property name or invalid value makes property
application
%   stop. All inputs are passed to gerhanaupdate_OpeningFcn
via varargin.
%
%   *See GUI Options on GUIDE's Tools menu. Choose "GUI allows
only one
%   instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help gerhanaupdate

% Last Modified by GUIDE v2.5 26-Jan-2016 19:09:29

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',          mfilename, ...
                   'gui_Singleton',    gui_Singleton, ...
                   'gui_OpeningFcn',   @gerhanaupdate_OpeningFcn,
...
                   'gui_OutputFcn',    @gerhanaupdate_OutputFcn, ...
                   'gui_LayoutFcn',    [] , ...
                   'gui_Callback',     []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

% Set the command line output to a more reasonable format
% for the user

```

```

end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT

% --- Executes just before gerhanaupdate is made visible.
function gerhanaupdate_OpeningFcn(hObject, eventdata, handles,
varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to gerhanaupdate (see
VARARGIN)

% Choose default command line output for gerhanaupdate
handles.output = hObject;

cnames =
{'No','Waktu(UT)', 'Bujur', 'Ket.Bujur', 'Lintang', 'Ket.Lintang', 'Azi
muth Matahari', 'Altitude Matahari', 'Perbandingan Rb dan
Rm', 'Durasi(Menit:Detik)', 'Nama Wilayah', 'Lebar Lintasan'};
set(handlesuitable1,'ColumnName',cnames);
set(handlesuitable1,'Data',[]);
set(handlesuitable1,'ColumnWidth',[30,70,75,75,75,75,110,100,150,
120,165,110]);
set(handlesuitable1,'Visible','on');
set(handles.axes1,'Visible','off');

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes gerhanaupdate wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = gerhanaupdate_OutputFcn(hObject, eventdata,
handles)
% varargout cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

```

```
% --- Executes on button press in bcek.
function bcek_Callback(hObject, eventdata, handles)
% hObject    handle to bcek (see GCBO)
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
pb=0;
A=0;
jam1=0.;
bujur1=0.28333;
lintang1=0;
ib=0;
ket=0;
menutanggalindex = get(handles.menutanggal, 'Value');
switch menutanggalindex
    case 1
        tanggal = 0;
        bulan = 0;
        tahun = 0;
    case 2
        tanggal = 9;
        bulan = 3;
        tahun = 2016;
    case 3
        tanggal = 21;
        bulan = 8;
        tahun = 2017;
    case 4
        tanggal = 2;
        bulan = 7;
        tahun = 2019;
    case 5
        tanggal = 14;
        bulan = 12;
        tahun = 2020;
    case 6
        tanggal = 4;
        bulan = 12;
        tahun = 2021;
    case 7
        tanggal = 8;
        bulan = 4;
        tahun = 2024;
    case 8
        tanggal = 12;
        bulan = 8;
        tahun = 2026;
    case 9
        tanggal = 2;
        bulan = 8;
        tahun = 2027;
    case 10
        tanggal = 22;
        bulan = 7;
```

```
    tahun = 2028;
case 11
    tanggal = 25;
    bulan = 11;
    tahun = 2030;
case 12
    tanggal = 30;
    bulan = 3;
    tahun = 2033;
case 13
    tanggal = 20;
    bulan = 3;
    tahun = 2034;
case 14
    tanggal = 2;
    bulan = 9;
    tahun = 2035;
case 15
    tanggal = 13;
    bulan = 7;
    tahun = 2037;
case 16
    tanggal = 26;
    bulan = 12;
    tahun = 2038;
case 17
    tanggal = 15;
    bulan = 12;
    tahun = 2039;
case 18
    tanggal = 30;
    bulan = 4;
    tahun = 2041;
case 19
    tanggal = 20;
    bulan = 4;
    tahun = 2042;
case 20
    tanggal = 23;
    bulan = 8;
    tahun = 2044;
case 21
    tanggal = 12;
    bulan = 8;
    tahun = 2045;
case 22
    tanggal = 2;
    bulan = 8;
    tahun = 2046;
case 23
    tanggal = 5;
    bulan = 12;
    tahun = 2048;
case 24
    tanggal = 30;
    bulan = 3;
```

```
    tahun = 2052;
case 25
    tanggal = 12;
    bulan = 9;
    tahun = 2053;
case 26
    tanggal = 24;
    bulan = 7;
    tahun = 2055;
case 27
    tanggal = 5;
    bulan = 1;
    tahun = 2057;
case 28
    tanggal = 26;
    bulan = 12;
    tahun = 2057;
case 29
    tanggal = 11;
    bulan = 5;
    tahun = 2059;
case 30
    tanggal = 30;
    bulan = 4;
    tahun = 2060;
case 31
    tanggal = 20;
    bulan = 4;
    tahun = 2061;
case 32
    tanggal = 24;
    bulan = 8;
    tahun = 2063;
case 33
    tanggal = 12;
    bulan = 8;
    tahun = 2064;
case 34
    tanggal = 17;
    bulan = 12;
    tahun = 2066;
case 35
    tanggal = 31;
    bulan = 5;
    tahun = 2068;
case 36
    tanggal = 11;
    bulan = 4;
    tahun = 2070;
case 37
    tanggal = 23;
    bulan = 9;
    tahun = 2071;
case 38
    tanggal = 12;
    bulan = 9;
```

```
    tahun = 2072;
case 39
    tanggal = 3;
    bulan = 8;
    tahun = 2073;
case 40
    tanggal = 16;
    bulan = 1;
    tahun = 2075;
case 41
    tanggal = 6;
    bulan = 1;
    tahun = 2076;
case 42
    tanggal = 22;
    bulan = 5;
    tahun = 2077;
case 43
    tanggal = 11;
    bulan = 5;
    tahun = 2078;
case 44
    tanggal = 1;
    bulan = 5;
    tahun = 2079;
case 45
    tanggal = 3;
    bulan = 9;
    tahun = 2081;
case 46
    tanggal = 24;
    bulan = 8;
    tahun = 2082;
case 47
    tanggal = 27;
    bulan = 12;
    tahun = 2084;
case 48
    tanggal = 11;
    bulan = 6;
    tahun = 2086;
case 49
    tanggal = 21;
    bulan = 4;
    tahun = 2088;
case 50
    tanggal = 4;
    bulan = 10;
    tahun = 2089;
case 51
    tanggal = 23;
    bulan = 9;
    tahun = 2090;
case 52
    tanggal = 15;
    bulan = 8;
```

```
    tahun = 2091;
case 53
    tanggal = 27;
    bulan = 1;
    tahun = 2093;
case 54
    tanggal = 16;
    bulan = 1;
    tahun = 2094;
case 55
    tanggal = 2;
    bulan = 6;
    tahun = 2095;
case 56
    tanggal = 22;
    bulan = 5;
    tahun = 2096;
case 57
    tanggal = 11;
    bulan = 5;
    tahun = 2097;
case 58
    tanggal = 14;
    bulan = 9;
    tahun = 2099;
case 59
    tanggal = 4;
    bulan = 9;
    tahun = 2100;
end

if tanggal==9 & bulan==3 & tahun==2016
A=1;
X0=-0.062417;
X1=0.5502769;
X2=0.0000047;
X3=-0.00000906;
Y0=0.253690;
Y1=0.1721233;
Y2=0.0000171;
Y3=-0.00000275;
d0=-4.37971;
d1=0.015886;
d2=0.000001;
M0=207.37216;
M1=15.003971;
L10=0.538861;
L11=-0.0000704;
L12=-0.0000128;
L20=-0.007227;
L21=-0.0000700;
L22=-0.0000127;
TAN_f1=0.0047087;
TAN_f2=0.0046852;
T0=2;
elseif tanggal==21 & bulan==8 & tahun==2017
```

```
A=1;
X0=-0.129588;
X1=0.5406426;
X2=-0.0000294;
X3=-0.00000810;
Y0=0.485236;
Y1=-0.1416400;
Y2=-0.0000905;
Y3=0.00000205;
d0=11.86696;
d1=-0.013622;
d2=-0.000002;
M0=89.24543;
M1=15.003938;
L10=0.542086;
L11=0.0001241;
L12=-0.0000118;
L20=-0.004018;
L21=0.0001234;
L22=-0.0000117;
TAN_f1=0.0046222;
TAN_f2=0.0045992;
T0=18;
elseif tanggal==2 & bulan==7 & tahun==2019
A=1;
X0=-0.215599;
X1=0.5662087;
X2=0.0000274;
X3=-0.00000879;
Y0=-0.650886;
Y1=0.0106399;
Y2=-0.0001272;
Y3=-0.00000027;
d0=23.01295;
d1=-0.003187;
d2=-0.000005;
M0=103.97973;
M1=14.999505;
L10=0.537624;
L11=-0.0000898;
L12=-0.0000120;
L20=-0.008457;
L21=-0.0000894;
L22=-0.0000120;
TAN_f1=0.0045984;
TAN_f2=0.0045755;
T0=19;
elseif tanggal==14 & bulan==12 & tahun==2020
A=1;
X0=-0.181780;
X1=0.5633567;
X2=0.0000216;
X3=-0.00000895;
Y0=-0.269825;
Y1=-0.0858122;
Y2=0.0001884;
```

```
Y3=0.00000150;
d0=-23.25776;
d1=-0.001986;
d2=0.000006;
M0=61.26591;
M1=14.996497;
L10=0.543855;
L11=0.0000970;
L12=-0.0000126;
L20=-0.002258;
L21=0.0000965;
L22=-0.0000125;
TAN_f1=0.0047502;
TAN_f2=0.0047266;
T0=16;
elseif tanggal==4 & bulan==12 & tahun==2021
A=1;
X0=0.025243;
X1=0.5683028;
X2=0.0000391;
X3=-0.00000966;
Y0=-0.983838;
Y1=-0.1315142;
Y2=0.0002213;
Y3=0.0000024;
d0=-22.27472;
d1=-0.005178;
d2=0.000006;
M0=302.45219;
M1=14.997279;
L10=0.537798;
L11=-0.000016;
L12=-0.0000131;
L20=-0.008285;
L21=-0.000016;
L22=-0.0000131;
TAN_f1=0.0047434;
TAN_f2=0.0047198;
T0=8;
elseif tanggal==8 & bulan==4 & tahun==2024
A=1;
X0=-0.318120;
X1=0.5117116;
X2=0.0000326;
X3=-0.00000842;
Y0=0.219627;
Y1=0.2709589;
Y2=-0.0000595;
Y3=-0.00000466;
d0=7.58620;
d1=0.014844;
d2=-0.000002;
M0=89.59122;
M1=15.004083;
L10=0.535807;
L11=0.0000618;
```

```
L12=-0.0000128;
L20=-0.010265;
L21=0.0000615;
L22=-0.0000127;
TAN_f1=0.0046683;
TAN_f2=0.0046450;
T0=18;
elseif tanggal==12 & bulan==8 & tahun==2026
A=1;
X0=0.475522;
X1=0.5189249;
X2=-0.0000773;
X3=-0.00000804;
Y0=0.770993;
Y1=-0.2301680;
Y2=-0.0001246;
Y3=0.00000377;
d0=14.79667;
d1=-0.012065;
d2=-0.000003;
M0=88.74779;
M1=15.003090;
L10=0.537948;
L11=0.0000939;
L12=-0.0000121;
L20=-0.008135;
L21=0.0000935;
L22=-0.0000121;
TAN_f1=0.0046141;
TAN_f2=0.0045911;
T0=18;
elseif tanggal==2 & bulan==8 & tahun==2027
A=1;
X0=-0.019750;
X1=0.5447123;
X2=-0.0000446;
X3=-0.00000922;
Y0=0.159870;
Y1=-0.2111583;
Y2=-0.0001217;
Y3=0.00000376;
d0=17.76247;
d1=-0.010181;
d2=-0.000004;
M0=328.42254;
M1=15.002096;
L10=0.530589;
L11=0.0000138;
L12=-0.0000128;
L20=-0.015457;
L21=0.0000137;
L22=-0.0000128;
TAN_f1=0.0046064;
TAN_f2=0.0045834;
T0=10;
elseif tanggal==22 & bulan==7 & tahun==2028
```

```

A=1;
X0=-0.154372;
X1=0.5449892;
X2=-0.0000214;
X3=-0.00000869;
Y0=-0.586615;
Y1=-0.1746085;
Y2=-0.0001021;
Y3=0.00000296;
d0=20.18231;
d1=-0.007974;
d2=-0.000005;
M0=223.37868;
M1=15.001017;
L10=0.535230;
L11=-0.0000859;
L12=-0.0000123;
L20=-0.010840;
L21=-0.0000854;
L22=-0.0000122;
TAN_f1=0.0046016;
TAN_f2=0.0045786;
T0=3;
elseif tanggal==25 & bulan==11 & tahun==2030
A=1;
X0=0.044200;
X1=0.5787799;
X2=0.0000177;
X3=-0.00000978;
Y0=-0.392846;
Y1=-0.0551891;
Y2=0.0001744;
Y3=0.00000083;
d0=-20.76100;
d1=-0.007989;
d2=0.000005;
M0=288.27459;
M1=14.998361;
L10=0.538206;
L11=-0.0000379;
L12=-0.0000130;
L20=-0.007878;
L21=-0.0000377;
L22=-0.0000130;
TAN_f1=0.0047361;
TAN_f2=0.0047125;
T0=7;
elseif tanggal==30 & bulan==3 & tahun==2033
A=1;
X0=-0.318696;
X1=0.5554245;
X2=0.0000227;
X3=-0.00000942;
Y0=0.924538;
Y1=0.1756610;
Y2=-0.0000801;

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```
Y3=-0.00000289;
d0=4.09368;
d1=0.015719;
d2=-0.000001;
M0=88.92808;
M1=15.004455;
L10=0.534936;
L11=0.0000276;
L12=-0.0000129;
L20=-0.011132;
L21=0.0000275;
L22=-0.0000129;
TAN_f1=0.0046807;
TAN_f2=0.0046574;
T0=18;
elseif tanggal==20 & bulan==3 & tahun==2034
A=1;
X0=-0.259452;
X1=0.5481629;
X2=0.0000234;
X3=-0.00000897;
Y0=0.220626;
Y1=0.1755790;
Y2=-0.0000080;
Y3=-0.00000279;
d0=-0.05513;
d1=0.016042;
d2=-0.00000;
M0=328.13912;
M1=15.004401;
L10=0.538624;
L11=-0.0000665;
L12=-0.0000127;
L20=-0.007462;
L21=-0.0000662;
L22=-0.0000126;
TAN_f1=0.0046952;
TAN_f2=0.0046718;
T0=10;
elseif tanggal==2 & bulan==9 & tahun==2035
A=1;
X0=0.134306;
X1=0.5377735;
X2=-0.0000360;
X3=-0.00000812;
Y0=0.348813;
Y1=-0.1584651;
Y2=-0.0000595;
Y3=0.00000232;
d0=8.01771;
d1=-0.014783;
d2=-0.000002;
M0=210.02999;
M1=15.004641;
L10=0.541913;
L11=0.0001103;
```

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L12=-0.0000119;
L20=-0.004190;
L21=0.0001098;
L22=-0.0000118;
TAN_f1=0.0046328;
TAN_f2=0.0046097;
T0=2;
elseif tanggal==13 & bulan==7 & tahun==2037
A=1;
X0=0.141575;
X1=0.5635996;
X2=0.0000001;
X3=-0.00000869;
Y0=-0.733892;
Y1=-0.0318218;
Y2=-0.0001131;
Y3=0.0000041;
d0=21.78243;
d1=-0.006046;
d2=-0.000005;
M0=223.55013;
M1=15.000224;
L10=0.538376;
L11=-0.0001101;
L12=-0.0000120;
L20=-0.007709;
L21=-0.0001096;
L22=-0.0000119;
TAN_f1=0.0045993;
TAN_f2=0.0045764;
T0=3;
elseif tanggal==26 & bulan==12 & tahun==2038
A=1;
X0=-0.020568;
X1=0.5698562;
X2=-0.0000002;
X3=-0.00000912;
Y0=-0.287568;
Y1=-0.0379711;
Y2=0.0001915;
Y3=0.00000073;
d0=-23.36258;
d1=0.001481;
d2=0.000006;
M0=194.92213;
M1=14.996374;
L10=0.543500;
L11=0.0000867;
L12=-0.0000126;
L20=-0.002610;
L21=0.0000863;
L22=-0.0000126;
TAN_f1=0.0047537;
TAN_f2=0.0047300;
T0=1;
elseif tanggal==15 & bulan==12 & tahun==2039
```

```
A=1;
X0=-0.365886;
X1=0.5769287;
X2=0.0000473;
X3=-0.00000981;
Y0=-0.902298;
Y1=-0.0849487;
Y2=0.0002295;
Y3=0.00000160;
d0=-23.27405;
d1=-0.001862;
d2=0.000006;
M0=61.22590;
M1=14.9966522;
L10=0.538200;
L11=-0.000004;
L12=-0.0000131;
L20=-0.007885;
L21=-0.000004;
L22=-0.0000131;
TAN_f1=0.0047499;
TAN_f2=0.0047262;
T0=16;
elseif tanggal==30 & bulan==4 & tahun==2041
A=1;
X0=0.246590;
X1=0.5066721;
X2=0.0000112;
X3=-0.00000731;
Y0=-0.382274;
Y1=0.2242315;
Y2=-0.0000740;
Y3=-0.00000342;
d0=14.97447;
d1=0.012128;
d2=-0.000003;
M0=0.70737;
M1=15.002539;
L10=0.545200;
L11=0.0001104;
L12=-0.0000116;
L20=-0.000919;
L21=0.0001099;
L22=-0.0000116;
TAN_f1=0.0046415;
TAN_f2=0.0046184;
T0=12;
elseif tanggal==20 & bulan==4 & tahun==2042
A=1;
X0=-0.282156;
X1=0.5204320;
X2=0.0000418;
X3=-0.00000861;
Y0=0.190376;
Y1=0.2561881;
Y2=-0.0000819;
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Y3=-0.00000444;
d0=11.51744;
d1=0.013670;
d2=-0.000003;
M0=210.25866;
M1=15.003454;
L10=0.534676;
L11=0.0000561;
L12=-0.0000128;
L20=-0.011391;
L21=0.0000558;
L22=-0.0000127;
TAN_f1=0.0046543;
TAN_f2=0.0046311;
T0=2;
elseif tanggal==23 & bulan==8 & tahun==2044
A=1;
X0=0.279569;
X1=0.5107779;
X2=-0.0000610;
X3=-0.00000797;
Y0=0.933625;
Y1=-0.2512821;
Y2=-0.0001094;
Y3=0.00000413;
d0=11.26904;
d1=-0.013582;
d2=-0.000002;
M0=194.34898;
M1=15.004007;
L10=0.537683;
L11=0.0001028;
L12=-0.0000122;
L20=-0.008399;
L21=0.0001023;
L22=-0.0000122;
TAN_f1=0.0046232;
TAN_f2=0.0046001;
T0=1;
elseif tanggal==12 & bulan==8 & tahun==2045
A=1;
X0=0.240734;
X1=0.5332199;
X2=-0.0000535;
X3=-0.00000902;
Y0=0.123877;
Y1=-0.2388144;
Y2=-0.0000966;
Y3=0.00000423;
d0=14.67394;
d1=-0.012107;
d2=-0.000003;
M0=88.76048;
M1=15.003169;
L10=0.530936;
L11=-0.0000029;
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L12=-0.0000129;
L20=-0.015112;
L21=-0.0000029;
L22=-0.0000128;
TAN_f1=0.0046137;
TAN_f2=0.0045908;
T0=18;
elseif tanggal==2 & bulan==8 & tahun==2046
A=1;
X0=-0.382108;
X1=0.5318330;
X2=-0.0000108;
X3=-0.00000838;
Y0=-0.425511;
Y1=-0.2069787;
Y2=-0.0000898;
Y3=0.00000345;
d0=17.65568;
d1=-0.010271;
d2=-0.000004;
M0=328.41596;
M1=15.002112;
L10=0.536204;
L11=-0.0000798;
L12=-0.0000122;
L20=-0.009870;
L21=-0.0000794;
L22=-0.0000122;
TAN_f1=0.0046066;
TAN_f2=0.0045836;
T0=10;
elseif tanggal==5 & bulan==12 & tahun==2048
A=1;
X0=0.230330;
X1=0.5806540;
X2=-0.0000024;
X3=-0.00000978;
Y0=-0.401813;
Y1=-0.0107019;
Y2=0.0001924;
Y3=0.0000007;
d0=-22.49575;
d1=-0.004931;
d2=0.00006;
M0=62.27963;
M1=14.997149;
L10=0.538893;
L11=-0.0000506;
L12=-0.0000130;
L20=-0.007195;
L21=-0.0000503;
L22=-0.0000130;
TAN_f1=0.0047445;
TAN_f2=0.0047209;
T0=16;
elseif tanggal==30 & bulan==3 & tahun==2052
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A=1;
X0=0.160389;
X1=0.5483147;
X2=0.0000117;
X3=-0.00000893;
Y0=0.389416;
Y1=0.1717027;
Y2=-0.0000423;
Y3=-0.00000272;
d0=4.26382;
d1=0.015707;
d2=-0.000001;
M0=103.96399;
M1=15.004423;
L10=0.538291;
L11=-0.0000908;
L12=-0.0000126;
L20=-0.007794;
L21=-0.0000903;
L22=-0.0000125;
TAN_f1=0.0046807;
TAN_f2=0.0046574;
T0=19;
elseif tanggal==12 & bulan==9 & tahun==2053
A=1;
X0=0.325331;
X1=0.5364330;
X2=-0.0000375;
X3=-0.00000817;
Y0=0.226670;
Y1=-0.1685794;
Y2=-0.0000291;
Y3=0.00000249;
d0=3.91319;
d1=-0.015512;
d2=-0.000001;
M0=330.96356;
M1=15.004990;
L10=0.541857;
L11=0.0000990;
L12=-0.0000120;
L20=-0.004245;
L21=0.0000985;
L22=-0.0000119;
TAN_f1=0.0046454;
TAN_f2=0.0046223;
T0=10;
elseif tanggal==24 & bulan==7 & tahun==2055
A=1;
X0=-0.079351;
X1=0.5582301;
X2=0.0000028;
X3=-0.00000852;
Y0=-0.797697;
Y1=-0.0699515;
Y2=-0.0000936;
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Y3=0.00000099;
d0=19.81362;
d1=-0.008628;
d2=-0.000005;
M0=328.34844;
M1=15.001232;
L10=0.539364;
L11=-0.0001059;
L12=-0.0000119;
L20=-0.006726;
L21=-0.0001054;
L22=-0.0000118;
TAN_f1=0.0046021;
TAN_f2=0.0045792;
T0=10;
elseif tanggal==5 & bulan==1 & tahun==2057
A=1;
X0=0.120543;
X1=0.5722665;
X2=-0.0000209;
X3=-0.00000922;
Y0=-0.281932;
Y1=0.0094215;
Y2=0.0001831;
Y3=-0.00000005;
d0=-22.52547;
d1=0.004876;
d2=0.000006;
M0=328.63068;
M1=14.996917;
L10=0.543036;
L11=0.0000770;
L12=-0.0000127;
L20=-0.003072;
L21=0.0000766;
L22=-0.0000126;
TAN_f1=0.0047548;
TAN_f2=0.0047312;
T0=10;
elseif tanggal==26 & bulan==12 & tahun==2057
A=1;
X0=-0.198956;
X1=0.5818051;
X2=0.0000241;
X3=-0.00000990;
Y0=-0.930198;
Y1=-0.0358837;
Y2=0.0002335;
Y3=0.00000075;
d0=-23.34527;
d1=0.001602;
d2=0.000006;
M0=194.88423;
M1=14.996418;
L10=0.538479;
L11=-0.0000104;
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L12=-0.0000131;
L20=-0.007606;
L21=-0.0000103;
L22=-0.0000131
TAN_f1=0.0047534;
TAN_f2=0.0047298;
T0=1;
elseif tanggal==11 & bulan==5 & tahun==2059
A=1;
X0=-0.011920;
X1=0.5197702;
X2=0.0000258;
X3=-0.00000761;
Y0=-0.548247;
Y1=0.1978978;
Y2=-0.0000880;
Y3=-0.00000307;
d0=18.03314;
d1=0.010098;
d2=-0.000004;
M0=105.89467;
M1=15.001516;
L10=0.543597;
L11=0.0001205;
L12=-0.0000117;
L20=-0.002514;
L21=0.0001199;
L22=-0.0000116;
TAN_f1=0.0046298;
TAN_f2=0.0046067;
T0=19;
elseif tanggal==30 & bulan==4 & tahun==2060
A=1;
X0=-0.186085;
X1=0.5315517;
X2=0.0000450;
X3=-0.00000885;
Y0=0.182376;
Y1=0.2346059;
Y2=-0.0001054;
Y3=-0.00000410;
d0=15.06878;
d1=0.012049;
d2=-0.000003;
M0=330.71164;
M1=15.002564;
L10=0.533634;
L11=0.0000474;
L12=-0.0000128;
L20=-0.012427;
L21=0.0000472;
L22=-0.0000127;
TAN_f1=0.0046411;
TAN_f2=0.0046180;
T0=10;
elseif tanggal==20 & bulan==4 & tahun==2061

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```
A=1;
X0=-0.391919;
X1=0.5207760;
X2=0.0000643;
X3=-0.00000858;
Y0=0.874241;
Y1=0.2539408;
Y2=-0.0001155;
Y3=-0.00000439;
d0=11.66528;
d1=0.013618;
d2=-0.000002;
M0=225.28180;
M1=15.003417;
L10=0.534966;
L11=-0.0000602;
L12=-0.0000127;
L20=-0.011102;
L21=-0.0000599;
L22=-0.0000127;
TAN_f1=0.0046541;
TAN_f2=0.0046309;
T0=3;
elseif tanggal==24 & bulan==8 & tahun==2063
A=1;
X0=-0.070033;
X1=0.5232786;
X2=-0.0000295;
X3=-0.0000084;
Y0=0.343976;
Y1=-0.2596770;
Y2=-0.0000847;
Y3=0.00000458;
d0=11.13078;
d1=-0.013609;
d2=-0.000002;
M0=194.36823;
M1=15.004072;
L10=0.531431;
L11=0.0000081;
L12=-0.0000129;
L20=-0.014620;
L21=0.0000081;
L22=-0.0000128;
TAN_f1=0.0046230;
TAN_f2=0.0046000;
T0=1;
elseif tanggal==12 & bulan==8 & tahun==2064
A=1;
X0=-0.070226;
X1=0.5190735;
X2=-0.0000214;
X3=-0.00000811;
Y0=-0.478623;
Y1=-0.2331515;
Y2=-0.0000651;
```

```
Y3=0.00000383;
d0=14.55016;
d1=-0.012183;
d2=-0.000003;
M0=88.77208;
M1=15.003177;
L10=0.537259;
L11=-0.0000978;
L12=-0.0000122;
L20=-0.008820;
L21=-0.0000973;
L22=-0.0000121;
TAN_f1=0.0046141;
TAN_f2=0.0045911;
T0=18;
elseif tanggal==17 & bulan==12 & tahun==2066
A=1;
X0=-0.202269;
X1=0.5788602;
X2=0.0000054;
X3=-0.00000970;
Y0=-0.418202;
Y1=0.0368780;
Y2=0.0002023;
Y3=-0.00000074;
d0=-23.34729;
d1=-0.001582;
d2=0.00006;
M0=181.02414;
M1=14.996462;
L10=0.539535;
L11=-0.0000352;
L12=-0.0000130;
L20=-0.006556;
L21=-0.0000351;
L22=-0.0000129;
TAN_f1=0.0047506;
TAN_f2=0.0047270;
T0=0;
elseif tanggal==31 & bulan==5 & tahun==2068
A=1;
X0=0.066432;
X1=0.5481974;
X2=-0.0000134;
X3=-0.00000777;
Y0=-0.795036;
Y1=0.0244838;
Y2=-0.0001118;
Y3=-0.00000027;
d0=22.02278;
d1=0.005644;
d2=-0.000005;
M0=240.53245;
M1=14.999823;
L10=0.545935;
L11=0.0001158;
```

```
L12=-0.0000113;
L20=-0.000187;
L21=0.0001152;
L22=-0.0000113;
TAN_f1=0.0046118;
TAN_f2=0.0045888;
T0=4;
elseif tanggal==11 & bulan==4 & tahun==2070
A=1;
X0=0.116648;
X1=0.5504562;
X2=0.0000216;
X3=-0.00000891;
Y0=0.414392;
Y1=0.1607142;
Y2=-0.0000696;
Y3=-0.00000252;
d0=8.41019;
d1=0.014903;
d2=-0.000002;
M0=224.73706;
M1=15.004049;
L10=0.538080;
L11=-0.0000932;
L12=-0.0000125;
L20=-0.008004;
L21=-0.0000928;
L22=-0.0000124;
TAN_f1=0.0046667;
TAN_f2=0.0046434;
T0=3;
elseif tanggal==23 & bulan==9 & tahun==2071
A=1;
X0=-0.103171;
X1=0.5370933;
X2=-0.0000096;
X3=-0.00000827;
Y0=0.307921;
Y1=-0.1718955;
Y2=-0.0000075;
Y3=0.00000257;
d0=-0.31420;
d1=-0.015794;
d2=-0.00000;
M0=76.93185;
M1=15.004953;
L10=0.541746;
L11=0.0001150;
L12=-0.0000121;
L20=-0.004355;
L21=0.0001144;
L22=-0.0000120;
TAN_f1=0.0046586;
TAN_f2=0.0046354;
T0=17;
elseif tanggal==12 & bulan==9 & tahun==2072
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```
A=1;
X0=0.297960;
X1=0.5561905;
X2=-0.0000275;
X3=-0.00000947;
Y0=0.918228;
Y1=-0.1762265;
Y2=-0.0000746;
Y3=0.00000292;
d0=3.77284;
d1=-0.015506;
d2=-0.000001;
M0=315.99016;
M1=15.005050;
L10=0.532790;
L11=0.0000217;
L12=-0.0000129;
L20=-0.013267;
L21=0.0000216;
L22=-0.0000128;
TAN_f1=0.0046450;
TAN_f2=0.0046218;
T0=9;
elseif tanggal==3 & bulan==8 & tahun==2073
A=1;
X0=-0.301506;
X1=0.5511557;
X2=0.0000093;
X3=-0.00000832;
Y0=-0.835370;
Y1=-0.1026031;
Y2=-0.0000713;
Y3=0.00000148;
d0=17.18994;
d1=-0.010861;
d2=-0.000004;
M0=73.44228;
M1=15.002341;
L10=0.540537;
L11=-0.0001013;
L12=-0.0000118;
L20=-0.005559;
L21=-0.0001008;
L22=-0.0000118;
TAN_f1=0.0046078;
TAN_f2=0.0045849;
T0=17;
elseif tanggal==16 & bulan==1 & tahun==2075
A=1;
X0=0.254145;
X1=0.5710232;
X2=-0.0000383;
X3=-0.00000926;
Y0=-0.257440;
Y1=0.0536085;
Y2=0.0001646;
```

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Y3=-0.00000078;
d0=-20.79370;
d1=0.007995;
d2=0.000005;
M0=102.56072;
M1=14.998014;
L10=0.542428;
L11=0.0000674;
L12=-0.0000127;
L20=-0.003677;
L21=0.0000670;
L22=-0.0000127;
TAN_f1=0.0047529;
TAN_f2=0.0047292;
T0=19;
elseif tanggal==6 & bulan==1 & tahun==2076
A=1;
X0=-0.052071;
X1=0.5824669;
X2=0.0000022;
X3=-0.00000990;
Y0=-0.938806;
Y1=0.0123864;
Y2=0.0002259;
Y3=-0.00000009;
d0=-22.47513;
d1=0.004989;
d2=0.000006;
M0=328.59516;
M1=14.996977;
L10=0.538660;
L11=-0.0000193;
L12=-0.0000131;
L20=-0.007427;
L21=-0.0000192;
L22=-0.0000131;
TAN_f1=0.0047545;
TAN_f2=0.0047309;
T0=10;
elseif tanggal==22 & bulan==5 & tahun==2077
A=1;
X0=0.293438;
X1=0.5331974;
X2=0.0000110;
X3=-0.00000789;
Y0=-0.508578;
Y1=0.1652241;
Y2=-0.0001093;
Y3=-0.00000261;
d0=20.49352;
d1=0.007674;
d2=-0.000005;
M0=225.80885;
M1=15.000511;
L10=0.542202;
L11=0.0001046;
```

```
L12=-0.0000117;
L20=-0.003902;
L21=0.0001041;
L22=-0.0000117;
TAN_f1=0.0046192;
TAN_f2=0.0045962;
T0=3;
elseif tanggal==11 & bulan==5 & tahun==2078
A=1;
X0=-0.036825;
X1=0.5440809;
X2=0.0000413;
X3=-0.00000911;
Y0=0.182408;
Y1=0.2062585;
Y2=-0.0001286;
Y3=-0.00000363;
d0=18.12168;
d1=0.010001;
d2=-0.000004;
M0=90.88991;
M1=15.001536;
L10=0.532699;
L11=0.0000363;
L12=-0.0000128;
L20=-0.013357;
L21=0.0000361;
L22=-0.0000127;
TAN_f1=0.0046292;
TAN_f2=0.0046061;
T0=18;
elseif tanggal==1 & bulan==5 & tahun==2079
A=1;
X0=-0.276489;
X1=0.5302500;
X2=0.0000660;
X3=-0.00000871;
Y0=0.869939;
Y1=0.2314249;
Y2=-0.0001394;
Y3=-0.00000400;
d0=15.20186;
d1=0.011980;
d2=-0.000003;
M0=345.71424;
M1=15.002513;
L10=0.534678;
L11=-0.0000680;
L12=-0.0000127;
L20=-0.011389;
L21=-0.0000677;
L22=-0.0000126;
TAN_f1=0.0046410;
TAN_f2=0.0046179;
T0=11;
elseif tanggal==3 & bulan==9 & tahun==2081
```

```
A=1;
X0=0.094263;
X1=0.5156432;
X2=-0.0000268;
X3=-0.00000869;
Y0=0.332318;
Y1=-0.2740714;
Y2=-0.0000606;
Y3=0.00000482;
d0=7.22193;
d1=-0.014687;
d2=-0.000002;
M0=315.18861;
M1=15.004698;
L10=0.532066;
L11=-0.0000041;
L12=-0.0000129;
L20=-0.013988;
L21=-0.0000041;
L22=-0.0000128;
TAN_f1=0.0046341;
TAN_f2=0.0046110;
T0=9;
elseif tanggal==24 & bulan==8 & tahun==2082
A=1;
X0=-0.316454;
X1=0.5078963;
X2=-0.0000021;
X3=-0.00000784;
Y0=-0.289915;
Y1=-0.2526639;
Y2=-0.0000517;
Y3=0.00000410;
d0=10.98988;
d1=-0.013671;
d2=-0.000002;
M0=194.38231;
M1=15.004071;
L10=0.538537;
L11=-0.0000890;
L12=-0.0000121;
L20=-0.007549;
L21=-0.0000886;
L22=-0.0000121;
TAN_f1=0.0046233;
TAN_f2=0.0046003;
T0=1;
elseif tanggal==27 & bulan==12 & tahun==2084
A=1;
X0=-0.070870;
X1=0.5729242;
X2=-0.0000155;
X3=-0.00000955;
Y0=-0.424763;
Y1=0.0855706;
Y2=0.0002007;
```

```
Y3=-0.00000157;
d0=-23.26555;
d1=0.001886;
d2=0.000006;
M0=314.67560;
M1=14.996441;
L10=0.540011;
L11=-0.0000450;
L12=-0.0000130;
L20=-0.006082;
L21=-0.0000448;
L22=-0.0000129;
TAN_f1=0.0047538;
TAN_f2=0.0047301;
T0=9;
elseif tanggal==11 & bulan==6 & tahun==2086
A=1;
X0=-0.088581;
X1=0.5506569;
X2=-0.0000180;
X3=-0.00000790;
Y0=-0.719249;
Y1=-0.0172014;
Y2=-0.0001237;
Y3=0.00000034;
d0=23.12593;
d1=0.002725;
d2=-0.000006;
M0=345.02404;
M1=14.999268;
L10=0.544621;
L11=0.0001193;
L12=-0.0000114;
L20=-0.001495;
L21=0.0001187;
L22=-0.0000114;
TAN_f1=0.0046053;
TAN_f2=0.0045824;
T0=11;
elseif tanggal==21 & bulan==4 & tahun==2088
A=1;
X0=0.157435;
X1=0.5541417;
X2=0.0000252;
X3=-0.00000891;
Y0=0.467406;
Y1=0.1426971;
Y2=-0.0000980;
Y3=-0.00000222;
d0=12.27414;
d1=0.013637;
d2=-0.000003;
M0=345.36243;
M1=15.003351;
L10=0.537888;
L11=-0.0000991;
```

```

L12=-0.0000124;
L20=-0.008195;
L21=-0.0000986;
L22=-0.0000124;
TAN_f1=0.0046525;
TAN_f2=0.0046294;
T0=11;
elseif tanggal==4 & bulan==10 & tahun==2089
A=1;
X0=-0.073637;
X1=0.5398158;
X2=-0.0000026;
X3=-0.00000838;
Y0=0.249775;
Y1=-0.1683441;
Y2=0.0000206;
Y3=0.00000254;
d0=-4.57125;
d1=-0.015620;
d2=0.000001;
M0=197.83991;
M1=15.004499;
L10=0.541814;
L11=0.0001101;
L12=-0.0000122;
L20=-0.004289;
L21=0.0001095;
L22=-0.0000121;
TAN_f1=0.0046728;
TAN_f2=0.0046495;
T0=1;
elseif tanggal==23 & bulan==9 & tahun==2090
A=1;
X0=0.312438;
X1=0.5554707;
X2=-0.0000192;
X3=-0.00000946;
Y0=0.861191;
Y1=-0.1789025;
Y2=-0.0000459;
Y3=0.00000297;
d0=-0.47153;
d1=-0.015774;
d2=0.000000;
M0=76.96498;
M1=15.004994;
L10=0.533385;
L11=0.0000147;
L12=-0.0000129;
L20=-0.012675;
L21=0.0000147;
L22=-0.0000129;
TAN_f1=0.0046583;
TAN_f2=0.0046351;
T0=17;
elseif tanggal==15 & bulan==8 & tahun==2091

```

```
A=1;
X0=0.010143;
X1=0.5435230;
X2=-0.0000044;
X3=-0.00000813;
Y0=-0.977951;
Y1=-0.1290791;
Y2=-0.0000422;
Y3=-0.00000187;
d0=14.00129;
d1=-0.012701;
d2=-0.000003;
M0=193.84064;
M1=15.003407;
L10=0.541714;
L11=-0.0001194;
L12=-0.0000118;
L20=-0.004388;
L21=-0.0001188;
L22=-0.0000117;
TAN_f1=0.0046152;
TAN_f2=0.0045922;
T0=1;
elseif tanggal==27 & bulan==1 & tahun==2093
A=1;
X0=-0.166192;
X1=0.5672931;
X2=-0.0000237;
X3=-0.00000927;
Y0=-0.304460;
Y1=0.0920882;
Y2=0.0001430;
Y3=-0.00000142;
d0=-18.27780;
d1=0.010671;
d2=0.000004;
M0=221.84154;
M1=14.999430;
L10=0.541633;
L11=0.0000822;
L12=-0.0000128;
L20=-0.004469;
L21=0.0000818;
L22=-0.0000127;
TAN_f1=0.0047483;
TAN_f2=0.0047246;
T0=3;
elseif tanggal==16 & bulan==1 & tahun==2094
A=1;
X0=0.100926;
X1=0.5794222;
X2=-0.0000168;
X3=-0.00000983;
Y0=-0.928076;
Y1=0.0570106;
Y2=0.0002081;
```

```
Y3=-0.00000086;
d0=-20.71500;
d1=0.008090;
d2=0.000005;
M0=102.54384;
M1=14.998082;
L10=0.538712;
L11=-0.0000288;
L12=-0.0000131;
L20=-0.007375;
L21=-0.0000287;
L22=-0.0000130;
TAN_f1=0.0047526;
TAN_f2=0.0047289;
T0=19;
elseif tanggal==2 & bulan==6 & tahun==2095
A=1;
X0=0.076058;
X1=0.5455676;
X2=0.0000148;
X3=-0.00000819;
Y0=-0.639220;
Y1=0.1273288;
Y2=-0.0001184;
Y3=-0.00000207;
d0=22.24582;
d1=0.004941;
d2=-0.000005;
M0=330.45398;
M1=14.999693;
L10=0.540843;
L11=0.0001110;
L12=-0.0000118;
L20=-0.005254;
L21=0.0001104;
L22=-0.0000118;
TAN_f1=0.0046109;
TAN_f2=0.0045879;
T0=10;
elseif tanggal==22 & bulan==5 & tahun==2096
A=1;
X0=0.176430;
X1=0.5567474;
X2=0.0000294;
X3=-0.00000937;
Y0=0.179346;
Y1=0.1715819;
Y2=-0.0001492;
Y3=-0.00000305;
d0=20.56046;
d1=0.007570;
d2=-0.000005;
M0=210.79228;
M1=15.000532;
L10=0.531888;
L11=0.0000222;
```

```
L12=-0.0000128;
L20=-0.014165;
L21=0.0000221;
L22=-0.0000127;
TAN_f1=0.0046188;
TAN_f2=0.0045958;
T0=2;
elseif tanggal==11 & bulan==5 & tahun==2097
A=1;
X0=-0.068446;
X1=0.5409653;
X2=0.0000589;
X3=-0.00000886;
Y0=0.883427;
Y1=0.2023789;
Y2=-0.0001634;
Y3=-0.00000350;
d0=18.22874;
d1=0.009918;
d2=-0.000004;
M0=105.89085;
M1=15.001479;
L10=0.534490;
L11=-0.0000795;
L12=-0.0000126;
L20=-0.011576;
L21=-0.0000791;
L22=-0.0000125;
TAN_f1=0.0046292;
TAN_f2=0.0046062;
T0=19;
elseif tanggal==14 & bulan==9 & tahun==2099
A=1;
X0=0.208738;
X1=0.5110425;
X2=-0.0000197;
X3=-0.00000860;
Y0=0.334880;
Y1=-0.2818505;
Y2=-0.0000374;
Y3=0.00000495;
d0=3.08305;
d1=-0.015328;
d2=-0.000001;
M0=76.14336;
M1=15.004968;
L10=0.532822;
L11=-0.0000141;
L12=-0.0000129;
L20=-0.013236;
L21=-0.0000141;
L22=-0.0000128;
TAN_f1=0.0046466;
TAN_f2=0.0046235;
T0=17;
elseif tanggal==4 & bulan==9 & tahun==2100
```

```

A=1;
X0=-0.69995;
X1=0.4991349;
X2=-0.0000030;
X3=-0.00000763;
Y0=-0.346284;
Y1=-0.2657267;
Y2=-0.0000265;
Y3=0.00000427;
d0=7.07443;
d1=-0.014736;
d2=-0.000002;
M0=315.21890;
M1=15.004678;
L10=0.539866;
L11=-0.0001031;
L12=-0.0000121;
L20=-0.006226;
L21=-0.0001026;
L22=-0.0000120;
TAN_f1=0.0046346;
TAN_f2=0.0046116;
T0=9;
else
A=0;
set(handles.uitable1,'Data',[]);
cla(handles.axes1,'reset');
set(handles.uipanel4, 'SelectedObject', handles.tabell);
set(handles.uitable1, 'Visible','on');
set(handles.axes1, 'Visible','off');
set(handles.tktext, 'String','Tanggal tidak terdaftar');
end

if A==1
%listing program gerhana
while jam1 <24;

jamdesimal=jam1;
jam=floor(jamdesimal);
sisaj=jamdesimal-jam;
menit=floor(60*sisaj);
sisam=60*sisaj-menit;
detik=floor(60*sisam);

Jam=floor(jam);
Menit=menit;
Detik=detik;
jam_desimal=Jam+Menit+Detik;

ab1=num2str(jam);
ab2=':';
ab3=num2str(menit);
ab4=':';
ab5=num2str(detik);
jam_desimal=strcat(ab1,ab2,ab3,ab4,ab5);

```

```

T=(tahun-2000);
delta_T=62.92+0.32217*T+0.005589*T*T;

TD=jam+menit/60+detik/3600+delta_T/3600;

t=TD-T0;

X=X0+X1*t+X2*t*t+X3*t*t*t;
Y=Y0+Y1*t+Y2*t*t+Y3*t*t*t;
dd=d0+d1*t+d2*t*t;
d=dd/180*pi;
M=M0+M1*t;
L2=L20+L21*t+L22*t*t;
X_aksen=X1+2*X2*t+3*X3*t*t;
Y_aksen=Y1+2*Y2*t+3*Y3*t*t;
w=1/sqrt(1-0.006694385*cos(d)*cos(d));
p=M1/57.2957795;
b=Y_aksen-p*X*sin(d);
c=X_aksen+p*Y*sin(d);
y1=w*Y;
b1=w*sin(d);
b2=0.99664719*w*cos(d);
B=sqrt(1-X*X-y1*y1);

if isreal(B)==0
    jam1=jam1+0.016667;
else
    HH=atan2(X,(B*b2-y1*b1));
    H=HH/pi*180;

    fail=asin(B*b1+y1*b2);
    fail1=fail/pi*180;
    TAN_lintang=1.00336409*tan(fail);
    lintanglin=atan(TAN_lintang);
    lintang=lintanglin/pi*180;
    lintang1=lintang;

    if lintang < 0
        lintangket='Negatif';
    else
        lintangket='Positif';
    end
    if lintang < 0
        lintang=abs(lintang);
    end

jam=floor(lintang);
sisaj=lintang-jam;
menit=floor(60*sisaj);
sisam=60*sisaj-menit;
detik=floor(60*sisam);

```

```

aa1=num2str(jam);
aa2=':';
aa3=num2str(menit);
aa4=':';
aa5=num2str(detik);
Lintang=strcat(aa1,aa2,aa3,aa4,aa5);

bujur=H+0.00417807*delta_T-M;

if bujur < (-180)
    bujurl=bujur+360;
elseif bujur >180
    bujurl=bujur-360;
else
    bujurl=bujur;
end

if bujurl<0
    bujurket='Negatif';
else
    bujurket='Positif';
end

jam=floor(abs(bujurl));
sisaj=abs(bujurl)-jam;
menit=floor(60*sisaj);
sisam=60*sisaj-menit;
detik=floor(60*sisam);

jam=floor(abs(bujurl));
sisaj=abs(bujurl)-jam;
menit=floor(60*sisaj);
sisam=60*sisaj-menit;
detik=floor(60*sisam);

bb1=num2str(jam);
bb2=':';
bb3=num2str(menit);
bb4=':';
bb5=num2str(detik);
Bujur=strcat(bb1,bb2,bb3,bb4,bb5);

L2_aksen=L2-B*TAN_f2;
a=c-p*B*cos(d);
n=sqrt (a*a+b*b);
Durasi=abs(7200*(L2_aksen)/n);
menitdur=floor(abs(Durasi)/60);
detikdur=(abs(Durasi-menitdur)*60));

cc1=num2str(menitdur);
cc2=':';
cc3=num2str(detikdur);
durasi=strcat(cc1,cc2,cc3);

```

```

K=sqrt(B^2+((X*a+Y*b)/n)^2);
lebar_lintasan=(12756*abs(L2_aksen)/K);
L1_aksen=L10+L11*t+L12*t*t-B*TAN_f1;
perbandingan_radius_bulan_matahari=(L1_aksen-
L2_aksen)/(L1_aksen+L2_aksen);

SIN_altitude=sin(d)*sin(lintanglin)+cos(d)*cos(lintanglin)*cos(HH)
;
altitude=asin(SIN_altitude);
Altitude2=abs(altitude/pi*180);

jamal=floor(abs(Altitude2));
sisaal=abs(Altitude2)-jamal;
menital=floor(60*sisaal);
sisamal=60*sisaal-menital;
detikal=floor(60*sisamal);

a11=num2str(jamal);
a12=':';
a13=num2str(menital);
a14=':';
a15=num2str(detikal);
Altitude=strcat(a11,a12,a13,a14,a15);

azimuthhh=sin(HH)/(cos(HH)*sin(lintanglin)-
tan(d)*cos(lintanglin));
azimuth=atan(azimuthhh);
Azimuth1=azimuth/pi*180;
Azimuth2=mod((Azimuth1+180),360);

jamat=floor(abs(Azimuth2));
sisaat=abs(Azimuth2)-jamat;
menitat=floor(60*sisaat);
sisamat=60*sisaat-menitat;
detikat=floor(60*sisamat);

at1=num2str(jamat);
at2=':';
at3=num2str(menitat);
at4=':';
at5=num2str(detikat);
Azimuth=strcat(at1,at2,at3,at4,at5);

if Azimuth < 0
    azimuth1=Azimuth+360;
elseif Azimuth > 0
    azimuth1=Azimuth-360;
else
    azimuth1=Azimuth;
end

jam1=jam1+0.016667;

```

```

        if perbandingan_radius_bulan_matahari>=1
            ket=kett+1;
        end
        if perbandingan_radius_bulan_matahari<=1
            ket=ket-1;
        end

%09/03/2016
if bujur1<=99.992 & bujur1>=88.282 & lintang1>=(-2.786) & lintang1<=(-2.2493)
    NP='Samudera India';
elseif bujur1<=101.750 & bujur1>=99.5840 & lintang1>=(-2.7920) & lintang1<=(-2.786)
    NP='Kepulauan Mentawai';
%
elseif bujur1<=101.790 & bujur1>=100.00 & lintang1>=(-2.8035) & lintang1<=(-2.792)
NP='Pantai Barat Aceh';
elseif bujur1<=105.787 & bujur1>=101.685 & lintang1>=(-2.8120) & lintang1<=(-2.7570)
NP='Sumatera Selatan';
elseif bujur1<=106.6827 & bujur1>=105.787 & lintang1>=(-2.7186) & lintang1<=(-2.688)
NP='Pulau Bangka';
elseif bujur1<=108.112 & bujur1>=106.6827 & lintang1>=(-2.688) & lintang1<=(-2.6236)
NP='Pulau Belitung';
elseif bujur1<=110.187 & bujur1>=108.112 & lintang1>=(-2.6236) & lintang1<=(-2.496)
NP='Laut Jawa';
elseif bujur1<=116.422 & bujur1>=110.187 & lintang1>=(-2.496) & lintang1<=(-1.857)
NP='Kalimantan Tengah';
elseif bujur1<=119.295 & bujur1>=116.422 & lintang1>=(-1.857) & lintang1<=(-1.423)
NP='Selat Makasar';
elseif bujur1<=123.3435 & bujur1>=119.422 & lintang1>=(-1.423) & lintang1<=(-0.627)
NP='Sulawesi Tengah';
elseif bujur1<=125.8204 & bujur1>=123.3435 & lintang1>=(-0.6825) & lintang1<=0.0684
NP='Laut Maluku';
elseif bujur1<=128.0629 & bujur1>=126.1045 & lintang1>=0.01580 & lintang1<=0.5736
NP='Maluku Utara';
elseif bujur1<=130.6129 & bujur1>=128.3148 & lintang1>=0.4488 & lintang1<=1.3935
NP='Laut Halmahera';
%
elseif bujur1<=179.9405 & bujur1>=130.5725 & lintang1>=1.3935 & lintang1<=3257679
NP='Samudera Pasifik Utara';
%
elseif bujur1<=179.9405 & bujur1>=(-179.3253) & lintang1>=25.7679 & lintang1<=32.54
NP='Samudera Pasifik Utara';
%
elseif bujur1<=179.9405 & bujur1>=(-179.3253) & lintang1>=1.3935 & lintang1<=32.54
NP='Samudera Pasifik Utara';

```

```

%NP='Samudera Pasifik Utara';

%21/08/2017
elseif bujur1>=(-171.56) & bujur1<=(-124.10) &
lintang1<=44.95 & lintang1>=39.74
NP='Samudera Pasifik Utara';
elseif bujur1>=(-124.10) & bujur1<=(-79.45) &
lintang1<=44.84 & lintang1>=32.95
NP='United State,Amerika';
elseif bujur1>=(-79.45) & bujur1<=(-27.46) &
lintang1<=32.95 & lintang1>=10.99
NP='Samudera Atlantik Utara';

%02/07/2019
elseif bujur1>=(-160.4004) & bujur1<=(-71.2793) &
lintang1<=(-20.595) & lintang1>=(-37.6542)
NP='Samudera Pasifik Selatan';
elseif bujur1>=(-71.2793) & bujur1<=(-63.0002) &
lintang1<=(-26.000) & lintang1>=(-33.6542)
NP='Argentina,Amerika Selatan';

%14/12/2020
elseif bujur1>=(-132.8027) & bujur1<=(-73.3447) &
lintang1<=(-7.7796) & lintang1>=(-33.1374)
NP='Samudera Pasifik Selatan';
elseif bujur1>=(-76.9813) & bujur1<=(-62.1289) &
lintang1<=(-37.6802) & lintang1>=(-41.9994)
NP='Argentina,Amerika Selatan';
elseif bujur1>=(-62.1289) & bujur1<=(9.4656) &
lintang1<=(-24.250) & lintang1>=(-42.123)
NP='Samudera Atlantik Selatan';

%4/12/2021
elseif bujur1>=(-134.6823) & bujur1<=(-38.100) &
lintang1<=(-54.00) & lintang1>=(-81.55)
NP='Samudera Antartika';

%08/04/2024
elseif bujur1>=(-158.4668) & bujur1<=(-132.8579) &
lintang1<=(-0.08467) & lintang1>=(-7.8111)
NP='Samudera Pasifik Selatan';
elseif bujur1>=(-132.2592) & bujur1<=(-106.078) &
lintang1<=23.2292 & lintang1>=0.2700
NP='Samudera Pasifik Utara';
elseif bujur1>=(-106.0783) & bujur1<=(-100.481) &
lintang1<=28.8004 & lintang1>=23.2292
NP='Mexico';
elseif bujur1>=(-100.481) & bujur1<=(-67.0549) &
lintang1<=46.0549 & lintang1>=28.8004
NP='United State,Amerika';
elseif bujur1>=(-67.0549) & bujur1<=(-52.998) &
lintang1<=48.6736 & lintang1>=46.0549
NP='Kanada';

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        elseif bujur1>=(-52.998) & bujur1<=(-19.8633) &
lintang1<=49.1111 & lintang1>=47.6269
        NP='Samudera Atlantik Utara';

%12/08/2026
elseif bujur1>=(-23.3908) & bujur1<=114.1802 &
lintang1<=89.7082 & lintang1>=75.047
        NP='Samudera Artik';
elseif bujur1>=(-28.554) & bujur1<=(-23.9062) &
lintang1<=82.7082 & lintang1>=69.168
        NP='Greenland, Amerika Utara';
elseif bujur1>=(-26.554) & bujur1<=(-3.9551) &
lintang1<=68.668 & lintang1>=42.2188
        NP='Samudera Atlantik Utara';
elseif bujur1>=(-3.9551) & bujur1<=5.2734 &
lintang1<=42.2188 & lintang1>=38.6752
        NP='Eropa';

%02/08/2027
elseif bujur1>=(-44.3848) & bujur1<=(-5.9326) &
lintang1<=35.6698 & lintang1>=27.9828
        NP='Samudera Atlantik Utara';
elseif bujur1>=(-5.9326) & bujur1<=(-2.1973) &
lintang1<=35.86698 & lintang1>=35.0606
        NP='Maroko';
elseif bujur1>=(-2.1973) & bujur1<=8.3057 &
lintang1<=35.7606 & lintang1>=34.7526
        NP='Algeria';
elseif bujur1>=8.3057 & bujur1<=11.6137 &
lintang1<=34.9526 & lintang1>=33.2424
        NP='Tunisia';
elseif bujur1>=11.5137 & bujur1<=20.083 &
lintang1<=34.3424 & lintang1>=32.117
        NP='Laut Mediterania';
elseif bujur1>=20.083 & bujur1<=24.7852 &
lintang1<=32.1774 & lintang1>=30.1774
        NP='Libya';
elseif bujur1>=24.7852 & bujur1<=35.6397 &
lintang1<=30.1774 & lintang1>=23.8798
        NP='Mesir';
elseif bujur1>=35.6397 & bujur1<=39.1333 &
lintang1<=23.923 & lintang1>=21.1429
        NP='Laut Merah';
elseif bujur1>=39.1333 & bujur1<=43.5418 &
lintang1<=21.1429 & lintang1>=17.4152
        NP='Saudi Arabia';
elseif bujur1>=43.418 & bujur1<=47.5708 &
lintang1<=17.5152 & lintang1>=13.7922
        NP='Yaman';
elseif bujur1>=47.5708 & bujur1<=50.1636 &
lintang1<=13.8349 & lintang1>=11.5414
        NP='Teluk Aden';
elseif bujur1>=50.1336 & bujur1<=51.1304 &
lintang1<=11.65148 & lintang1>=10.679
        NP='Somalia, Afrika';

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        elseif bujur1>=51.1304 & bujur1<=90.4394 &
lintang1<=10.679 & lintang1>=(-12.4323)
NP='Samudera India';

%22/07/2028
elseif bujur1<=125.15 & bujur1>=75.65 & lintang1>=(-
18.37) & lintang1<=(-10.00)
NP='Samudera India';
elseif bujur1<=129.0015 & bujur1>=125.15 &
lintang1>=(-16.9533) & lintang1<=(-14.7127)
NP='Australia Barat';
elseif bujur1<=137.9883 & bujur1>=129.0015 &
lintang1>=(-23.4895) & lintang1<=(-16.9533)
NP='Australia Utara';
elseif bujur1<=144.8438 & bujur1>=137.9883 &
lintang1>=(-29.0206) & lintang1<=(-23.4895)
NP='Queensland';
elseif bujur1<=151.2598 & bujur1>=144.8438 &
lintang1>=(-33.9279) & lintang1<=(-29.0206)
NP='New South Wales';
elseif bujur1<=167.85 & bujur1>=151.22 & lintang1>=(-
44.49) & lintang1<=(-33.95)
NP='Laut Tasman';
elseif bujur1<=174.2655 & bujur1>=167.85 &
lintang1>=(-48.91) & lintang1<=(-44.49)
NP='New Zealand';
%
elseif bujur1<=179.52 & bujur1>=170.51 &
lintang1>=(-50.48) & lintang1<=(-45.91)
NP='Samudera Pasifik Selatan';

%25/11/2030
elseif bujur1<=13.58 & bujur1>=1.63 & lintang1>=(-
21.25) & lintang1<=(-16.22)
NP='Samudera Atlantik Selatan';
elseif bujur1<=19.1898 & bujur1>=13.58 & lintang1>=(-
24.1898) & lintang1<=(-21.25)
NP='Namibia, Afrika Selatan';
elseif bujur1<=22.8516 & bujur1>=19.1898 &
lintang1>=(-25.5652) & lintang1<=(-24.1898)
NP='Botswana, Afrika Selatan';
elseif bujur1<=31.1792 & bujur1>=22.8516 &
lintang1>=(-29.6336) & lintang1<=(-25.5652)
NP='Afrika Selatan';
elseif bujur1<=134.25 & bujur1>=31.20 & lintang1>=(-
44.50) & lintang1<=(-29.47)
NP='Samudera India';
elseif bujur1<=140.9985 & bujur1>=134.25 &
lintang1>=(-32.9589) & lintang1<=(-30.3568)
NP='Australia Selatan';
elseif bujur1<=144.3604 & bujur1>=140.9985 &
lintang1>=(-30.3568) & lintang1<=(-29.0427)
NP='New South Wales';
elseif bujur1<=151.1719 & bujur1>=144.3604 &
lintang1>=(-30.3568) & lintang1<=(-26.3554)
NP='Queensland';

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%30/03/2033
elseif bujur1<=(-165.3223) & bujur1>=(-178.8059) &
lintang1>=60.9667 & lintang1<=64.4671
NP='Samudera Pasifik Utara';
elseif bujur1<=(-154.500) & bujur1>=(-175.4702) &
lintang1>=60.9667 & lintang1<=82.746
NP='Kanada';
elseif bujur1>=(-155.9062) & bujur1<=142.99881 &
lintang1<=71.1746 & lintang1>=82.4701
NP='Samudera Artik';

%20/03/2034
elseif bujur1<=(-18.9844) & bujur1>=(-37.5293) &
lintang1>=(-0.98855) & lintang1<=(0.1494)
NP='Samudera Atlantik Selatan';
elseif bujur1>=(-18.844) & bujur1<=1.3796 &
lintang1<=6.1361 & lintang1>=0.1494
NP='Samudera Atlantik Utara';
elseif bujur1>=(4.3066) & bujur1<=14.6338 &
lintang1<=11.6027 & lintang1>=6.3524
NP='Nigeria, Afrika Barat';
elseif bujur1>=14.6338 & bujur1<=24.0381 &
lintang1<=17.1345 & lintang1>=11.6207
NP='Chad, Afrika Tengah';
elseif bujur1>=24.0381 & bujur1<=32.6953 &
lintang1<=21.9777 & lintang1>=17.1345
NP='sudan, Afrika Utara';
elseif bujur1>=32.6953 & bujur1<=35.5518 &
lintang1<=23.3967 & lintang1>=21.9777
NP='Mesir, Afrika Utara';
elseif bujur1>=35.5078 & bujur1<=37.6853 &
lintang1<=24.4412 & lintang1>=23.437
NP='Laut Merah';
elseif bujur1>=37.4853 & bujur1<=48.3398 &
lintang1<=28.7234 & lintang1>=24.4412
NP='Saudi Arabia';
elseif bujur1>=48.3398 & bujur1<=50.625 &
lintang1<=29.4147 & lintang1>=28.7234
NP='Teluk Persia';
elseif bujur1>=50.625 & bujur1<=60.9961 &
lintang1<=31.8664 & lintang1>=29.4147
NP='Iran';
elseif bujur1>=60.06199 & bujur1<=70.2246 &
lintang1<=33.54938 & lintang1>=31.8664
NP='Afganistan';
elseif bujur1>=70.2246 & bujur1<=73.5644 &
lintang1<=33.8595 & lintang1>=33.4938
NP='Pakistan';
elseif bujur1>=73.5644 & bujur1<=92.5928 &
lintang1<=34.7723 & lintang1>=33.8595
NP='Cina';

%02/09/2035
elseif bujur1>=79.585 & bujur1<=119.6631 &
lintang1<=40.9047 & lintang1>=38.0602

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        NP='Cina';
    elseif bujur1>=119.6631 & bujur1<=125.376 &
lintang1<=39.9047 & lintang1>=39.2952
        NP='Yellow Sea, Laut Kuning';
    elseif bujur1>=125.376 & bujur1<=127.8809 &
lintang1<=39.2952 & lintang1>=38.9885
        NP='Korea Utara';
    elseif bujur1>=127.8809 & bujur1<=136.6699 &
lintang1<=38.9885 & lintang1>=37.2627
        NP='Laut Jepang';
    elseif bujur1>=136.6699 & bujur1<=140.669 &
lintang1<=37.2627 & lintang1>=36.2062
        NP='Jepang';
    elseif bujur1>=(-179.7363) & bujur1<=179.7363 &
lintang1<=36.2062 & lintang1>=5.4377
        NP='Samudera Pasifik Utara';

%13/07/2037
elseif bujur1>=89.2969 & bujur1<=115.7852 &
lintang1<=(-27.0811) & lintang1>=(-39.7123)
    NP='Samudera India';
elseif bujur1<=129.0234 & bujur1>=114.7852 &
lintang1>=(-29.0975) & lintang1<=(-25.1314)
    NP='Australia Barat';
elseif bujur1<=138.1013 & bujur1>=129.0234 &
lintang1>=(-25.1314) & lintang1<=(-24.6099)
    NP='Australia Utara';
elseif bujur1<=153.6328 & bujur1>=138.1013 &
lintang1>=(-28.6812) & lintang1<=(-24.9314)
    NP='Queensland';
elseif bujur1<=174.6387 & bujur1>=153.6328 &
lintang1>=(-38.2779) & lintang1<=(-28.5034)
    NP='Laut Tasman';
elseif bujur1<=178.9732 & bujur1>=174.7266 &
lintang1>=(-40.4413) & lintang1<=(-38.3813)
    NP='New Zealand';
elseif bujur1<=(-170.3979) & bujur1>=(-178.5280) &
lintang1>=(-45.2772) & lintang1<=(-39.4413)
    NP='Samudera Pasifik Selatan';

%26/12/2038
elseif bujur1>=95.3394 & bujur1<=115.2246 &
lintang1<=(-11.8706) & lintang1>=(-21.5992)
    NP='Samudera India';
elseif bujur1<=129.0015 & bujur1>=115.2246 &
lintang1>=(-28.9437) & lintang1<=(-11.8706)
    NP='Australia Barat';
elseif bujur1<=140.9766 & bujur1>=129.00151 &
lintang1>=(-34.473) & lintang1<=(-28.9437)
    NP='Australia Selatan';
elseif bujur1<=149.7876 & bujur1>=140.9766 &
lintang1>=(-37.5646) & lintang1<=(-34.473)
    NP='New South Wales';
elseif bujur1<=172.4854 & bujur1>=149.7876 &
lintang1>=(-40.5998) & lintang1<=(-37.5656)
    NP='Laut Tasman';

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        elseif bujur1<=179.86821 & bujur1>=169.1840 &
lintang1>=(-40.75998) & lintang1<=(-40.03993)
        NP='New Zealand';
        elseif bujur1<=(-121.2891) & bujur1>=(-179.821) &
lintang1>=(-40.0993) & lintang1<=(-18.8782)
        NP='Samudera Pasifik Selatan';

%15/12/2039
        elseif bujur1>=173.4961 & bujur1<=179.8242 &
lintang1<=(-55.0356) & lintang1>=(-59.4585)
        NP='Samudera India';
        elseif bujur1>=(-179.8242) & bujur1<=(179.98704) &
lintang1<=(-59.4585) & lintang1>=(-88.6698)
        NP='Samudera Antartika';

%30/04/2041
        elseif bujur1<=13.3841 & bujur1>=(-46.7468) &
lintang1>=(-48.488) & lintang1<=(-8.6032)
        NP='Samudera Atlantik Selatan';
        elseif bujur1<=16.6415 & bujur1>=13.3841 &
lintang1>=(-8.6032) & lintang1<=(-6.0945)
        NP='Angola, Afrika Selatan';
        elseif bujur1<=29.751 & bujur1>=16.6415 & lintang1>=(-
6.0945) & lintang1<=(-0.0406)
        NP='Republik Kongo, Afrika Selatan';
        elseif bujur1<=34.4092 & bujur1>=29.751 &
lintang1>=0.0406 & lintang1<=0.8316
        NP='Uganda, Afrika Selatan';
        elseif bujur1<=40.6774 & bujur1>=34.4092 &
lintang1>=0.8316 & lintang1<=1.2496
        NP='Kenya, Afrika Selatan';
        elseif bujur1<=44.121 & bujur1>=41.001 &
lintang1>=1.1612 & lintang1<=1.3503
        NP='Somalia, Afrika Selatan';
        elseif bujur1<=66.6376 & bujur1>=44.121 & lintang1>=(-
2.7464) & lintang1<=1.1612
        NP='Samudera India';

%20/04/2042
        elseif bujur1<=101.3269 & bujur1>=82.2876 &
lintang1>=(-8.9317) & lintang1<=(-2.7472)
        NP='Samudera India';
        elseif bujur1<=104.3976 & bujur1>=101.3269 &
lintang1>=(-2.8120) & lintang1<=(-1.2335)
        NP='Jambi, Sumatera Selatan';
        elseif bujur1<=109.9404 & bujur1>=104.3976 &
lintang1>=(-0.98300) & lintang1<=(-0.23879)
        NP='Laut Jawa';
        elseif bujur1<=110.82368 & bujur1>=104.3976 &
lintang1>=0.0306 & lintang1<=2.8108
        NP='Pontianak, Kalimantan Barat';
        elseif bujur1<=113.5435 & bujur1>=110.12368 &
lintang1>=2.8108 & lintang1<=4.1037
        NP='Malaysia';

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        elseif bujur1<=115.2686 & bujur1>=113.5435 &
lintang1>=4.1037 & lintang1<=5.4881
            NP='Brunei Darussalam';
        elseif bujur1<=117.16526 & bujur1>=115.2686 &
lintang1>=4.5967 & lintang1<=7.30011
            NP='Sabah, Malaysia';
        elseif bujur1<=124.3652 & bujur1>=117.46526 &
lintang1>=7.0011 & lintang1<=13.9415
            NP='Filipina';
        elseif bujur1<=138.4496 & bujur1>=124.3652 &
lintang1>=13.9415 & lintang1<=27.9803
            NP='Laut Cina Timur';
%
        elseif bujur1<=179.8171 & bujur1>=124.3652 &
lintang1>=13.941 & lintang1<=45.1944
            NP='Samudera Atlantik Utara';
%
        elseif bujur1<=(-138.1641) & bujur1>=(-179.8171) &
lintang1>=13.9415 & lintang1<=46.94137
            NP='Samudera Pasifik Utara';
        elseif bujur1<=138.4496 & bujur1>=(-138.1641) &
lintang1>=27.9803 & lintang1<=46.94137
            NP='Samudera Pasifik Utara';

%23/08/2044
        elseif bujur1<=(-61.459) & bujur1>=(-71.0156) &
lintang1>=74.4458 & lintang1<=76.0016
            NP='Greenland, Amerika Utara';
        elseif bujur1<=(-71.0156) & bujur1>=(-89.41894) &
lintang1>=76.7545 & lintang1<=77.1865
            NP='Teluk Baffin';
        elseif bujur1<=(-88.1894) & bujur1>=(-101.0303) &
lintang1>=75.4963 & lintang1<=76.8478
            NP='Nunvut, Amerika Utara';
        elseif bujur1<=(-101.0303) & bujur1>=(-117.096196) &
lintang1>=68.973 & lintang1<=78.4963
            NP='Pulau Victoria, Amerika Utara';
        elseif bujur1<=(-109.3359) & bujur1>=(-120.86196) &
lintang1>=49.0292 & lintang1<=69.0373
            NP='Kanada, Amerika Utara';
        elseif bujur1<=(-102.9199) & bujur1>=(-109.3359) &
lintang1>=47.0911 & lintang1<=49.0292
            NP='United State, Amerika Serikat';

%
%12/08/2045
        elseif bujur1>=(-159.6094) & bujur1<=(-124.2773) &
lintang1<=40.4369 & lintang1>=35.0912
            NP='Samudera Pasifik Utara';
        elseif bujur1>=(-124.2773) & bujur1<=(-80.3488) &
lintang1<=35.0912 & lintang1>=27.3266
            NP='United State, Amerika Serikat';
        elseif bujur1>=(-80.3488) & bujur1<=(-62.91826) &
lintang1<=27.3266 & lintang1>=10.7405
            NP='Republik Dominican';
        elseif bujur1>=(-62.1826) & bujur1<=(-59.8535) &
lintang1<=10.7405 & lintang1>=8.4876
            NP='Venezuela';

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        elseif bujur1>=(-59.8535) & bujur1<=(-57.1728) &
lintang1<=8.4876 & lintang1>=6.0029
            NP='Guyana';
        elseif bujur1>=(-57.1728) & bujur1<=(-54.3603) &
lintang1<=6.0029 & lintang1>=4.033
            NP='Suriname';
        elseif bujur1>=(-54.3603) & bujur1<=(-52.4707) &
lintang1<=4.033 & lintang1>=2.5853
            NP='Guiana';
        elseif bujur1>=(-52.4707) & bujur1<=(-34.8047) &
lintang1<=2.5853 & lintang1>=(-7.369)
            NP='Brasil';
        elseif bujur1>=(-34.8047) & bujur1<=(-22.1924) &
lintang1<=(-7.369) & lintang1>=(-11.6587)
            NP='Samudera Atlantik Selatan';

%02/08/2046
elseif bujur1>=(-37.749) & bujur1<=(-36.145) &
lintang1<=(-10.1235) & lintang1>=(-10.6239)
    NP='Brasil';
elseif bujur1>=(-36.145) & bujur1<=(13.7988) &
lintang1<=(-5.0035) & lintang1>=(-11.7878)
    NP='Samudera Atlantik Selatan';
elseif bujur1>=(13.7988) & bujur1<=(21.709) &
lintang1<=(-11.7878) & lintang1>=(-17.9432)
    NP='Angola, Afrika Barat';
elseif bujur1>=(21.709) & bujur1<=(27.6856) &
lintang1<=(-17.9432) & lintang1>=(-23.3281)
    NP='Botswana, Afrika Selatan';
elseif bujur1>=(27.6856) & bujur1<=(30.9375) &
lintang1<=(-23.3281) & lintang1>=(-26.1613)
    NP='Afrika Selatan';
elseif bujur1>=(32.6953) & bujur1<=(71.9824) &
lintang1<=(-27.6504) & lintang1>=(-50.3539)
    NP='Samudera India';

%05/12/2048
elseif bujur1<=(-74.99828) & bujur1>=(-131.001) &
lintang1>=(-43.87758) & lintang1<=(-20.6801)
    NP='Samudera Pasifik Selatan';
elseif bujur1<=(-71.1914) & bujur1>=(-74.98828) &
lintang1>=(-44.5952) & lintang1<=(-43.7958)
    NP='Chili, Amerika Selatan';
elseif bujur1<=(-66.8628) & bujur1>=(-71.1914) &
lintang1>=(-45.2223) & lintang1<=(-44.5952)
    NP='Argentina, Amerika Selatan';
elseif bujur1<=(14.8535) & bujur1>=(-68.8628) &
lintang1>=(-45.82772) & lintang1<=(-25.0119)
    NP='Samudera Atlantik Selatan';
elseif bujur1<=(20.4346) & bujur1>=(14.8535) &
lintang1>=(-25.0119) & lintang1<=(-22.5998)
    NP='Namibia,Afrika Selatan';

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%30/03/2052
elseif bujur1>=(-161.89) & bujur1<=(-105.450) &
lintang1<=20.56 & lintang1>=1.44
    NP='Samudera Pasifik Utara';
elseif bujur1>=(-105.450) & bujur1<=(-97.1515) &
lintang1<=24.9545 & lintang1>=20.7006
    NP='Mexico';
elseif bujur1>=(-97.1665) & bujur1<=(-86.0889) &
lintang1<=30.5847 & lintang1>=24.9545
    NP='Teluk Mexico';
elseif bujur1>=(-86.0889) & bujur1<=(-80.8594) &
lintang1<=32.2049 & lintang1>=30.5847
    NP='Georgia, United State';
elseif bujur1>=(-80.8594) & bujur1<=(-27.9492) &
lintang1<=36.4154 & lintang1>=32.3637
    NP='Samudera Atlantik Utara';

%12/09/2053
elseif bujur1>=(-31.5967) & bujur1<=(-5.6689) &
lintang1<=36.0743 & lintang1>=35.8252
    NP='Samudera Atlantik Utara';
elseif bujur1>=(-5.9326) & bujur1<=(-2.1973) &
lintang1<=35.86698 & lintang1>=35.0606
    NP='Maroko';
elseif bujur1>=(-2.1973) & bujur1<=8.3057 &
lintang1<=35.7606 & lintang1>=34.17526
    NP='Algeria';
elseif bujur1>=8.3057 & bujur1<=11.6137 &
lintang1<=34.9526 & lintang1>=33.2424
    NP='Tunisia';
elseif bujur1>=11.5137 & bujur1<=20.083 &
lintang1<=34.3424 & lintang1>=32.117
    NP='Laut Mediterania';
elseif bujur1>=20.083 & bujur1<=24.7852 &
lintang1<=32.1774 & lintang1>=30.1774
    NP='Libya';
elseif bujur1>=24.7852 & bujur1<=35.6397 &
lintang1<=30.1774 & lintang1>=23.8798
    NP='Mesir';
elseif bujur1>=35.6397 & bujur1<=39.1333 &
lintang1<=24.923 & lintang1>=21.1429
    NP='Laut Merah';
elseif bujur1>=39.1333 & bujur1<=43.5418 &
lintang1<=21.1429 & lintang1>=17.4152
    NP='Saudi Arabia';
elseif bujur1>=43.418 & bujur1<=47.5708 &
lintang1<=17.5152 & lintang1>=13.7922
    NP='Yaman';
elseif bujur1>=47.5708 & bujur1<=50.1636 &
lintang1<=13.8349 & lintang1>=11.5414
    NP='Teluk Aden';
elseif bujur1>=51.1304 & bujur1<=90.4394 &
lintang1<=10.679 & lintang1>=(-12.4323)
    NP='Samudera India';

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%24/07/2055
elseif bujur1<=18.3472 & bujur1>=(-21.8848) &
lintang1>=(-42.9591) & lintang1<=(-32.83464)
    NP='Samudera Atlantik Selatan';
elseif bujur1<=27.0703 & bujur1>=18.3472 &
lintang1>=(-33.2821) & lintang1<=(-32.4464)
    NP='Afrika Selatan';
elseif bujur1<=75.6519 & bujur1>=27.0703 &
lintang1>=(-55.1234) & lintang1<=(-44.2821)
    NP='Samudera India';

%05/01/2057
elseif bujur1<=(-31.184) & bujur1>=(-36.8701) &
lintang1>=(-39.184) & lintang1<=(-16.1549)
    NP='Samudera Atlantik Selatan';
elseif bujur1<=105.8643 & bujur1>=(-31.184) &
lintang1>=(-14.3744) & lintang1<=(-39.184)
    NP='Samudera India';

%26/12/2057
%11/05/2059
elseif bujur1<=(-80.1123) & bujur1>=(-156.4453) &
lintang1>=(-47.1832) & lintang1<=(-3.3635)
    NP='Samudera Pasifik Selatan';
elseif bujur1<=(-78.0908) & bujur1>=(-80.1123) &
lintang1>=(-3.3635) & lintang1<=(-3.263)
    NP='Ekuador, Amerika Selatan';
elseif bujur1<=(-70.6201) & bujur1>=(-79.908) &
lintang1>=(-3.6578) & lintang1<=(-3.263)
    NP='Peru, Amerika Selatan';
elseif bujur1<=(-47.2852) & bujur1>=(-70.6201) &
lintang1>=(-9.2666) & lintang1<=(-3.6578)
    NP='Brazil';

%30/04/2060
elseif bujur1<=(-12.4024) & bujur1>=(-35.0684) &
lintang1>=(-9.561) & lintang1<=(-0.0462)
    NP='Samudera Atlantik Selatan';
elseif bujur1>=(-12.085) & bujur1<=(-4.4385) &
lintang1<=5.62314 & lintang1>=(-0.0462)
    NP='Samudera Atlantik Utara';
elseif bujur1>=(-4.4385) & bujur1<=(-3.1641) &
lintang1<=6.2898 & lintang1>=5.2405
    NP='Abidjan, Cote d Ivoire';
elseif bujur1>=(-4.4385) & bujur1<=0.5713 &
lintang1<=9.3804 & lintang1>=6.2898
    NP='Ghana, Afrika Barat';
elseif bujur1>=0.5713 & bujur1<=1.3623 &
lintang1<=10.0302 & lintang1>=9.3804
    NP='Togo, Afrika Barat';
elseif bujur1>=1.3623 & bujur1<=3.4277 &
lintang1<=11.9283 & lintang1>=10.0302
    NP='';

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NP='Benin, Afrika Barat';
elseif bujur1>=3.4277 & bujur1<=15.0293 &
lintang1<=22.9517 & lintang1>=11.9283
NP='Niger, Afrika Barat';
elseif bujur1>=15.0293 & bujur1<=24.9609 &
lintang1<=30.9289 & lintang1>=22.9517
NP='Libya, Afrika Utara';
elseif bujur1>=25.9937 & bujur1<=35.4639 &
lintang1<=36.6052 & lintang1>=31.6051
NP='Laut Mediterania';
elseif bujur1>=35.4639 & bujur1<=44.6484 &
lintang1<=39.6677 & lintang1>=36.6052
NP='Turki';
elseif bujur1>=44.6484 & bujur1<=49.5483 &
lintang1<=40.7542 & lintang1>=39.6677
NP='Azerbaijan';
elseif bujur1>=49.5483 & bujur1<=54.0527 &
lintang1<=41.4702 & lintang1>=40.7542
NP='Laut Caspian';
elseif bujur1>=54.0527 & bujur1<=60.2051 &
lintang1<=41.9949 & lintang1>=41.4702
NP='Turkmenistan';
elseif bujur1>=60.2051 & bujur1<=66.0059 &
lintang1<=42.177 & lintang1>=41.9949
NP='Uzbekistan';
elseif bujur1>=66.0059 & bujur1<=70.7519 &
lintang1<=42.177 & lintang1>=42.0792
NP='Kazakhstan';
elseif bujur1>=70.7519 & bujur1<=78.5303 &
lintang1<=42.0792 & lintang1>=41.4564
NP='Kyrgyzstan';
elseif bujur1>=78.5303 & bujur1<=103.7988 &
lintang1<=41.4564 & lintang1>=36.4714
NP='Cina';

%20/04/2061
elseif bujur1>=40.8691 & bujur1<=46.8018 &
lintang1<=48.3538 & lintang1>=46.5236
NP='Krasnodar, Rusia';
elseif bujur1>=46.8018 & bujur1<=52.6465 &
lintang1<=51.5201 & lintang1>=48.3538
NP='Kazakhstan';
elseif bujur1>=40.8691 & bujur1<=59.41289 &
lintang1<=68.2555 & lintang1>=46.5236
NP='Rusia';
elseif bujur1>=10.5469 & bujur1<=57.51289 &
lintang1<=74.7951 & lintang1>=68.2555
NP='Samudera Artik';

%21/08/2063
elseif bujur1>=85.0781 & bujur1<=134.4727 &
lintang1<=43.0314 & lintang1>=41.8259
NP='Cina';
elseif bujur1>=134.4727 & bujur1<=140.0098 &
lintang1<=43.0314 & lintang1>=41.7331
NP='Laut Jepang';

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        elseif bujur1>=140.0098 & bujur1<=141.416 &
lintang1<=41.7331 & lintang1>=41.2723
            NP='Hokodate, Jepang';
        elseif bujur1>=141.416 & bujur1<=162.4219 &
lintang1<=41.2723 & lintang1>=0.1025
            NP='Samudera Pasifik Utara';
        elseif bujur1>=(-162.4219) & bujur1<=(-136.0547) &
lintang1<=0.1025 & lintang1>=(-10.0698)
            NP='Samudera Pasifik Selatan';

%12/08/2064
        elseif bujur1<=(-122.168) & bujur1>=(-150.4687) &
lintang1>=(-3.6158) & lintang1<=0.0732
            NP='Samudera Pasifik Selatan';
        elseif bujur1<=(-71.6309) & bujur1>=(-122.168) &
lintang1>=(-33.1069) & lintang1<=0.0732
            NP='Samudera Pasifik Selatan';
        elseif bujur1<=(-69.917) & bujur1>=(-71.6309) &
lintang1>=(-34.3283) & lintang1<=(-33.1069)
            NP='Chili';
        elseif bujur1<=(-62.0068) & bujur1>=(-69.917) &
lintang1>=(-39.3201) & lintang1<=(-34.3283)
            NP='Argentina, Amerika Selatan';
        elseif bujur1<=(-35.9033) & bujur1>=(-62.0068) &
lintang1>=(-49.8545) & lintang1<=(-39.3201)
            NP='Samudera Atlantik Selatan';

%17/12/2066
        elseif bujur1<=179.4727 & bujur1>=76.08 &
lintang1>=(-48.7499) & lintang1<=(-32.28)
            NP='Samudera India';
        elseif bujur1<=179.4727 & bujur1>=(-179.84727) &
lintang1>=(-47.9002) & lintang1<=(-18.6115)
            NP='Samudera Pasifik Selatan';

%31/06/2068
        elseif bujur1<=179.4727 & bujur1>=76.08 &
lintang1>=(-46.7499) & lintang1<=(-32.28)
            NP='Samudera India';
        elseif bujur1<=149.94 & bujur1>=115.71 & lintang1>=(-
36.96) & lintang1<=(-32.28)
            NP='Australia Selatan';
        elseif bujur1<=167.57 & bujur1>=149.94 & lintang1>=(-
44.70) & lintang1<=(-36.96)
            NP='Laut Tasman';
        elseif bujur1<=169.89 & bujur1>=167.57 & lintang1>=(-
45.75) & lintang1<=(-44.70)
            NP='New Zealand';

%31/06/2068
        elseif bujur1<=115.71 & bujur1>=76.08 & lintang1>=(-
50.00) & lintang1<=(-32.28)
            NP='Samudera India';

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        elseif bujur1<=149.94 & bujur1>=115.71 & lintang1>=(-
36.96) & lintang1<=(-32.28)
            NP='Australia Selatan';
        elseif bujur1<=167.57 & bujur1>=149.94 & lintang1>=(-
44.70) & lintang1<=(-36.96)
            NP='Laut Tasman';
        elseif bujur1<=169.89 & bujur1>=167.57 & lintang1>=(-
45.75) & lintang1<=(-44.70)
            NP='New Zealand';

%11/04/2070
elseif bujur1<=98.3936 & bujur1>=75.41092 &
lintang1>=5.1092 & lintang1<=10.7218
    NP='Samudera India';
elseif bujur1<=99.4922 & bujur1>=98.3936 &
lintang1>=10.7218 & lintang1<=11.067
    NP='Chumphon';
elseif bujur1<=102.7112 & bujur1>=99.4922 &
lintang1>=11.067 & lintang1<=12.1942
    NP='Teluk Thailand';
elseif bujur1<=107.3914 & bujur1>=102.7112 &
lintang1>=12.1942 & lintang1<=14.1943
    NP='Kamboja';
elseif bujur1<=108.9624 & bujur1>=107.3914 &
lintang1>=14.1943 & lintang1<=14.9112
    NP='Vietnam';
elseif bujur1<=123.6182 & bujur1>=108.9624 &
lintang1>=14.9112 & lintang1<=22.7728
    NP='Laut Cina Selatan';
elseif bujur1<=135.0751 & bujur1>=123.6182 &
lintang1>=22.7728 & lintang1<=29.0549
    NP='Laut Cina Timur';
elseif bujur1>=(-146.0742) & bujur1<=135.0751 &
lintang1<=37.4691 & lintang1>=29.0549
    NP='Samudera Pasifik Utara';

%23/09/2071
elseif bujur1>=(-116.0596) & bujur1<=(-145.5908) &
lintang1<=33.1529 & lintang1>=30.5
    NP='Samudera Pasifik Utara';
elseif bujur1>=(-116.0596) & bujur1<=(-114.6313) &
lintang1<=30.5 & lintang1>=30.229
    NP='California';
elseif bujur1>=(-114.6313) & bujur1<=(-112.6208) &
lintang1<=30.229 & lintang1>=29.7678
    NP='Teluk California';
elseif bujur1>=(-112.6208) & bujur1<=(-97.6904) &
lintang1<=29.7678 & lintang1>=25.2331
    NP='Mexico';
elseif bujur1>=(-97.6904) & bujur1<=(-89.1211) &
lintang1<=25.2331 && lintang1>=21.3593
    NP='Teluk Mexico';
elseif bujur1>=(-89.1211) & bujur1<=(-87.3083) &
lintang1<=21.3593 & lintang1>=20.421
    NP='Yucatan, Mexico';

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        elseif bujur1>=(-87.3083) & bujur1<=(-72.6416) &
lintang1<=20.421 & lintang1>=11.7213
        NP='Laut Caribbean';
        elseif bujur1>=(-72.6416) & bujur1<=(-72.0923) &
lintang1<=11.7213 & lintang1>=11.4199
        NP='Colombo';
        elseif bujur1>=(-72.0923) & bujur1<=(-60.8752) &
lintang1<=11.4199 & lintang1>=5.38
        NP='Venezuela';
        elseif bujur1>=(-60.8752) & bujur1<=(-58.0518) &
lintang1<=4.1647 & lintang1>=5.38
        NP='Guyana';
        elseif bujur1>=(-58.0518) & bujur1<=(-54.2615) &
lintang1<=4.1647 & lintang1>=2.7062
        NP='Suriname';
        elseif bujur1>=(-54.2615) & bujur1<=(-52.8662) &
lintang1<=2.7062 & lintang1>=2.2233
        NP='Guiana';
        elseif bujur1>=(-52.8662) & bujur1<=(-49.8889) &
lintang1<=2.2233 & lintang1>=1.3118
        NP='Brazil';
        elseif bujur1>=(-49.8889) & bujur1<=(-17.1167) &
lintang1<=1.3118 & lintang1>=(-2.5654)
        NP='Samudera Atlantik Selatan';

%12/09/2072
        elseif bujur1<=134.29 & bujur1>=96.47 & lintang<=82.50
& lintang>=57.93
        NP='Rusia';
        elseif bujur1<=179.75 & bujur1>=97.00 & lintang<=86.30
& lintang>=79.93
        NP='Samudera Artik';

%03/08/2073
        elseif bujur1<=(-75.6628) & bujur1>=(-133.8574) &
lintang1>=(-48.7429) & lintang1<=(-46.9065)
        NP='Samudera Pasifik Selatan';
        elseif bujur1<=(-73.4436) & bujur1>=(-75.6628) &
lintang1>=(-49.8037) & lintang1<=(-48.7429)
        NP='Chili';
        elseif bujur1<=(-68.4338) & bujur1>=(-73.4436) &
lintang1>=(-52.3834) & lintang1<=(-49.8037)
        NP='Argentina, Amerika Selatan';
        elseif bujur1<=(-41.9678) & bujur1>=(-68.4338) &
lintang1>=(-65.3775) & lintang1<=(-52.3834)
        NP='Samudera Antartika';

%16/01/2075
        elseif bujur1<=(-71.6309) & bujur1>=(-168.8818) &
lintang1>=(-30.7355) & lintang1<=(-20.2038)
        NP='Samudera Pasifik Selatan';
        elseif bujur1<=(-69.917) & bujur1>=(-71.6309) &
lintang1>=(-30.7355) & lintang1<=(-29.9771)
        NP='Chili';

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        elseif bujur1<=(-58.7988) & bujur1>=(-69.917) &
lintang1>=(-29.9771) & lintang1<=(-24.7502)
            NP='Argentina, Amerika Selatan';
        elseif bujur1<=(-55.5469) & bujur1>=(-58.7988) &
lintang1>=(-24.7502) & lintang1<=(-23.1033)
            NP='Paraguay';
        elseif bujur1<=(-38.9355) & bujur1>=(-55.5469) &
lintang1>=(-23.1033) & lintang1<=(-15.1393)
            NP='Brazil';
        elseif bujur1<=(-27.1582) & bujur1>=(-38.9355) &
lintang1>=(-15.1269) & lintang1<=(-10.1978)
            NP='Samudera Atlantik Selatan';

%06/01/2076

%22/05/2077
elseif bujur1<=120.3662 & bujur1>=94.7241 &
lintang1>=(-47.9102) & lintang1<=(-33.954)
    NP='Samudera India';
elseif bujur1<=129.0015 & bujur1>=120.3662 &
lintang1>=(-33.954) & lintang1<=(-27.5001)
    NP='Australia Barat';
elseif bujur1<=130.8911 & bujur1>=129.0015 &
lintang1>=(-27.5001) & lintang1<=(-26.0091)
    NP='Australia Selatan';
elseif bujur1<=138.0103 & bujur1>=130.8911 &
lintang1>=(-26.0091) & lintang1<=(-20.2742)
    NP='Australia Utara';
elseif bujur1<=145.612 & bujur1>=138.0103 &
lintang1>=(-20.2742) & lintang1<=(-14.7147)
    NP='Queensland';
elseif bujur1<=152.9297 & bujur1>=145.52612 &
lintang1>=(-14.9147) & lintang1<=(-10.9016)
    NP='Laut koral';
elseif bujur1<=159.0381 & bujur1>=152.9297 &
lintang1>=(-10.9016) & lintang1<=(-9.0976)
    NP='Laut Solomon';
elseif bujur1<=179.9607 & bujur1>=159.0381 &
lintang1>=(-9.0976) & lintang1<=(-7.8046)
    NP='Pulau Solomon';
%
elseif bujur1<=(-160.1367) & bujur1>=160.9607 &
lintang1>=(-16.6529) & lintang1<=(-8.8046)
    NP='Samudera Pasifik Selatan';
elseif bujur1<=179.9607 & bujur1>=(-179.1367) &
lintang1>=(-16.6529) & lintang1<=(-8.8046)
    NP='Samudera Pasifik Selatan';

%11/05/2078
elseif bujur1<=(-129.5508) & bujur1>=(-150.8203) &
lintang1>=(-9.7343) & lintang1<=0.1025
    NP='Samudera Pasifik Selatan';
elseif bujur1<=(-104.9853) & bujur1>=(-129.5508) &
lintang1>=0.1025 & lintang1<=19.4528
    NP='Samudera Pasifik Utara';
elseif bujur1<=(-97.1631) & bujur1>=(-104.9853) &
lintang1>=19.4528 & lintang1<=25.8955
    NP='Samudera Pasifik Utara';

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        NP='Mexico';
    elseif bujur1<=(-91.3184) & bujur1>=(-97.1631) &
lintang1>=25.8955 & lintang1<=29.5512
        NP='Teluk Mexico';
    elseif bujur1<=(-75.7178) & bujur1>=(-91.3184) &
lintang1>=29.5512 & lintang1<=36.0106
        NP='United State, Amerika';
    elseif bujur1<=(-14.0185) & bujur1>=(-75.7178) &
lintang1>=29.8565 & lintang1<=36.0106
        NP='Samudera Atlantik Utara';

%01/05/2079
elseif bujur1<=(-66.1816) & bujur1>=(-75.0586) &
lintang1>=40.2739 & lintang1<=43.8609
    NP='United State, Amerika';
elseif bujur1<=(-54.8437) & bujur1>=(-66.1816) &
lintang1>=43.8609 & lintang1<=51.8584
    NP='Kanada';
elseif bujur1<=(-48.1641) & bujur1>=(-54.8437) &
lintang1>=51.8584 & lintang1<=-61.3406
    NP='Laut Kanada';
elseif bujur1<=(-45.1641) & bujur1>=(-53.6133) &
lintang1>=61.3406 & lintang1<=82.2716
    NP='Greenland, Amerika Utara';
elseif bujur1<=(-55.6133) & bujur1>=(-175.2966) &
lintang1>=74.7026 & lintang1<=87.2716
    NP='Samudera Artik';

%03/09/2081
elseif bujur1<=(-4.2187) & bujur1>=(-30.2344) &
lintang1>=48.703 & lintang1<=47.4826
    NP='Samudera Atlantik Utara';
elseif bujur1<=7.5147 & bujur1>=(-4.2187) &
lintang1>=47.6481 & lintang1<=48.703
    NP='Prancis';
elseif bujur1<=9.5801 & bujur1>=7.5147 &
lintang1>=47.4107 & lintang1<=47.6481
    NP='Switzerland';
elseif bujur1<=14.7217 & bujur1>=9.5801 &
lintang1>=46.4505 & lintang1<=47.4107
    NP='Austria';
elseif bujur1<=15.6665 & bujur1>=14.7217 &
lintang1>=46.1862 & lintang1<=46.4505
    NP='Slovenia';
elseif bujur1<=19.0283 & bujur1>=15.6665 &
lintang1>=45.4203 & lintang1<=46.1862
    NP='Kroasia';
elseif bujur1<=22.5 & bujur1>=19.0283 &
lintang1>=44.4403 & lintang1<=45.4203
    NP='Serbia';
elseif bujur1<=24.5435 & bujur1>=22.5 &
lintang1>=43.7618 & lintang1<=44.4403
    NP='Rumania';
elseif bujur1<=27.6416 & bujur1>=24.5435 &
lintang1>=42.6636 & lintang1<=43.7618
    NP='Bulgaria';

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        elseif bujur1<=31.1572 & bujur1>=27.6416 &
lintang1>=41.1263 & lintang1<=42.6636
            NP='Laut Hitam';
        elseif bujur1<=39.375 & bujur1>=31.1572 &
lintang1>=36.7183 & lintang1<=41.1263
            NP='Turki';
        elseif bujur1<=41.2647 & bujur1>=39.375 &
lintang1>=35.4398 & lintang1<=36.7183
            NP='Syria';
        elseif bujur1<=48.3398 & bujur1>=41.2647 &
lintang1>=29.8184 & lintang1<=35.4398
            NP='Iraq';
        elseif bujur1<=54.0527 & bujur1>=48.3398 &
lintang1>=24.1835 & lintang1<=29.8184
            NP='Teluk Persian';
        elseif bujur1<=57.832 & bujur1>=54.0527 &
lintang1>=20.2382 & lintang1<=24.1835
            NP='Oman';
        elseif bujur1<=108.3252 & bujur1>=57.832 &
lintang1>=(-8.2586) & lintang1<=20.2382
            NP='Samudera India';

%24/08/2082
        elseif bujur1<=95.95 & bujur1>=95.91 & lintang<=2.808
& lintang>=1.812
            NP='Ai, Sinabang, Aceh';
        elseif bujur1<=97.31 & bujur1>=95.95 & lintang<=3.08 &
lintang>=1.812
            NP='Pantai Barat Aceh';
        elseif bujur1<=99.32 & bujur1>=97.31 & lintang<=3.43 &
lintang>=3.08
            NP='Sumatera Utara';
        elseif bujur1<=100.93 & bujur1>=97.31 & lintang<=3.69
& lintang>=3.43
            NP='Selat Malaka';
        elseif bujur1<=103.39 & bujur1>=100.93 & lintang<=4.05
& lintang>=3.69
            NP='Malaysia';
        elseif bujur1<=114.79 & bujur1>=103.39 &
lintang<=4.919 & lintang>=4.05
            NP='Laut Cina Selatan';
        elseif bujur1<=115.15 & bujur1>=114.79 &
lintang<=4.9205 & lintang>=4.919
            NP='Brunei Darussalam';
        elseif bujur1<=118.13 & bujur1>=115.15 &
lintang<=4.9205 & lintang>=4.867
            NP='Nabawah, Sabah';
        elseif bujur1<=120.36 & bujur1>=118.13 &
lintang<=4.867 & lintang>=4.747
            NP='Laut Cina Selatan';

%27/12/2084
        elseif bujur1<=21.8516 & bujur1>=(-38.0566) &
lintang1>=(-49.7827) & lintang1<=(-29.8089)
            NP='Samudera Atlantik Selatan';

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        elseif bujur1<=115.2686 & bujur1>=21.38516 &
lintang1>=(-49.7827) & lintang1<=(-14.4169)
NP='Samudera India';

%11/06/2086
elseif bujur1<=14.458& bujur1>=(-36.1011) &
lintang1>=(-40.2558) & lintang1<=(-23.3742)
NP='Samudera Atlantik Selatan';
elseif bujur1<=19.9951 & bujur1>=14.458 & lintang1>=(-
24.3788) & lintang1<=(-23.3742)
NP='Namibia, Afrika Selatan';
elseif bujur1<=24.7412 & bujur1>=19.9951 &
lintang1>=(-25.8312) & lintang1<=(-24.3788)
NP='Botswana, Afrika Selatan';
elseif bujur1<=32.0361 & bujur1>=24.7412 &
lintang1>=(-28.8559) & lintang1<=(-25.8312)
NP='Afrika Selatan';
elseif bujur1<=61.3477 & bujur1>=32.0361 &
lintang1>=(-28.8559) & lintang1<=(-43.3218)
NP='Samudera India';

%21/04/2088
elseif bujur1<=(-16.2817) & bujur1>=(-45.8569) &
lintang1>=9.7831 & lintang1<=19.9407
NP='Samudera Atlantik Utara';
elseif bujur1<=(-16.2817) & bujur1>=(-5.581) &
lintang1>=19.9407 & lintang1<=25.4912
NP='Mauritania';
elseif bujur1<=8.2837 & bujur1>=(-5.581) &
lintang1>=25.4912 & lintang1<=32.8688
NP='Algeria';
elseif bujur1<=10.2173 & bujur1>=8.2837 &
lintang1>=32.8688 & lintang1<=33.8415
NP='Tunisia';
elseif bujur1<=20.5444 & bujur1>=10.2173 &
lintang1>=33.8415 & lintang1<=38.0899
NP='Laut Mediterania';
elseif bujur1<=23.313 & bujur1>=20.5444 &
lintang1>=38.0899 & lintang1<=39.0348
NP='Greece, Yunani';
elseif bujur1<=26.1694 & bujur1>=23.313 &
lintang1>=39.0348 & lintang1<=39.8493
NP='Laut Aegean';
elseif bujur1<=35.0903 & bujur1>=26.1694 &
lintang1>=39.8493 & lintang1<=41.8927
NP='Turki';
elseif bujur1<=41.1108 & bujur1>=35.0903 &
lintang1>=41.8927 & lintang1<=42.7699
NP='Laut Hitam';
elseif bujur1<=43.1103 & bujur1>=41.1108 &
lintang1>=42.7699 & lintang1<=43.0113
NP='Georgia';
elseif bujur1<=47.5269 & bujur1>=43.1103 &
lintang1>=43.0113 & lintang1<=43.2999
NP='Rusia';

```

```

        elseif bujur1<=51.3171 & bujur1>=47.5269 &
lintang1>=43.2999 & lintang1<=43.4825
        NP='Laut Caspian';
        elseif bujur1<=56.0083 & bujur1>=51.3171 &
lintang1>=43.4825 & lintang1<=43.5393
        NP='Kazakhstan Barat';
        elseif bujur1<=65.6982 & bujur1>=56.0083 &
lintang1>=43.1397 & lintang1<=43.5393
        NP='Uzbekistan';
        elseif bujur1<=71.1475 & bujur1>=65.6982 &
lintang1>=43.1397 & lintang1<=42.6407
        NP='Kazakhstan Selatan';
        elseif bujur1<=78.9478 & bujur1>=71.1475 &
lintang1>=41.6469 & lintang1<=42.6407
        NP='Kyrgyzstan';
        elseif bujur1<=98.3936 & bujur1>=78.9478 &
lintang1>=38.0207 & lintang1<=41.6469
        NP='Cina';

%04/10/2089
        elseif bujur1<=119.9707 & bujur1>=97.6025 &
lintang1>=26.6442 & lintang1<=29.9327
        NP='Cina';
        elseif bujur1<=177.3633 & bujur1>=119.9707 &
lintang1>=0.0733 & lintang1<=26.6442
        NP='Samudera Pasifik Utara';
        elseif bujur1<=179.9633 & bujur1>=(-179.4502) &
lintang1>=(-6.81) & lintang1<=0.0733
        NP='Samudera Pasifik Selatan';

%23/09/2090
        elseif bujur1<=(-53.7891) & bujur1>=(-149.9414) &
lintang1>=66.9691 & lintang1<=84.6147
        NP='Samudera Artik';
        elseif bujur1<=(-40.4752) & bujur1>=(-53.7891) &
lintang1>=60.6838 & lintang1<=67.9691
        NP='Greenland, Amerika Utara';
        elseif bujur1<=(-2.4609) & bujur1>=(-40.4752) &
lintang1>=49.0619 & lintang1<=60.6838
        NP='Samudera Atlantik Utara';
        elseif bujur1<=3.8672 & bujur1>=(-2.4609) &
lintang1>=48.8551 & lintang1<=49.0619
        NP='Prancis';

%15/08/2091
%
        elseif bujur1<=113.5547 & bujur1>=177.3633 &
lintang1>=(-75.2568) & lintang1<=(-56.1292)
%
        NP='Samudera Antartika';
        elseif bujur1>=(-179.8242) & bujur1<=(179.8704) &
lintang1<=(-52.4585) & lintang1>=(-88.6698)
        NP='Samudera Antartika';

%27/01/2093

```

```

        elseif bujur1<=135.3076 & bujur1>=60.1172 &
lintang1>=(-34.4009) & lintang1<=(-23.9093)
            NP='Samudera India';
        elseif bujur1<=135.3076 & bujur1>=141.0205 &
lintang1>=(-34.4009) & lintang1<=(-32.7903)
            NP='Australia Selatan';
        elseif bujur1<=153.457 & bujur1>=141.0205 &
lintang1>=(-32.7903) & lintang1<=(-27.9782)
            NP='New South Wales';
        elseif bujur1<=165.553 & bujur1>=153.457 &
lintang1>=(-27.9782) & lintang1<=(-21.7552)
            NP='Laut Coral';
        elseif bujur1<=178.803 & bujur1>=165.553 &
lintang1>=(-21.7552) & lintang1<=(-15.459)
            NP='New Caledonia';
        elseif bujur1<=178.803 & bujur1>=(-179.6533) &
lintang1>=(-15.459) & lintang1<=(-6.3435)
            NP='Samudera Pasifik Selatan';

%16/01/2094
elseif bujur1>=(-179.8242) & bujur1<=(179.98704) &
lintang1<=(-59.4585) & lintang1>=(-89.6698)
    NP='Samudera Antartika';

%02/06/2095
elseif bujur1<=16.7871 & bujur1>=(-14.1504) &
lintang1>=(-47.886) & lintang1<=(-29.1969)
    NP='Samudera Atlantik Selatan';
elseif bujur1<=20.0391 & bujur1>=16.7871 &
lintang1>=(-29.1969) & lintang1<=(-26.3361)
    NP='Namibia, Afrika Selatan';
elseif bujur1<=28.0371 & bujur1>=20.0391 &
lintang1>=(-26.3361) & lintang1<=(-21.5996)
    NP='Botswana, Afrika Selatan';
elseif bujur1<=32.7393 & bujur1>=28.0371 &
lintang1>=(-21.5996) & lintang1<=(-18.837)
    NP='Zimbabwe, Afrika Selatan';
elseif bujur1<=32.7393 & bujur1>=40.6055 &
lintang1>=(-18.837) & lintang1<=(-15.4184)
    NP='Mozambique, Afrika Selatan';
elseif bujur1<=47.6587 & bujur1>=40.6055 &
lintang1>=(-15.4184) & lintang1<=(-14.362)
    NP='Selat Mozambique';
elseif bujur1<=47.6587 & bujur1>=50.2295 &
lintang1>=(-14.362) & lintang1<=(-14.2129)
    NP='Pulau Madagaskar';
elseif bujur1<=87.0117 & bujur1>=50.2295 &
lintang1>=(-24.6304) & lintang1<=(-14.2129)
    NP='Samudera India';

%22/05/2096
elseif bujur1<=104.3262 & bujur1>=94.9439 &
lintang1>=(-9.7) & lintang1<=(-5.7162)
    NP='Samudera India';
elseif bujur1<=105.8752 & bujur1>=104.3262 &
lintang1>=(-5.7162) & lintang1<=(-4.9441)

```

```

NP='Lampung, Sumatera Selatan';
elseif bujur1<=110.1929 & bujur1>=105.8752 &
lintang1>=(-4.9441) & lintang1<=(-2.6971)
    NP='Laut Jawa';
elseif bujur1<=114.884 & bujur1>=110.1929 &
lintang1>=(-2.6971) & lintang1<=(0.0266)
    NP='Kalimantan Tengah';
elseif bujur1<=117.8833 & bujur1>=114.884 &
lintang1>=(0.0266) & lintang1<=1.8939
    NP='Kalimantan Timur';
elseif bujur1<=124.1455 & bujur1>=117.8833 &
lintang1>=1.8939 & lintang1<=6.2434
    NP='Laut Celebes';
elseif bujur1<=126.3648 & bujur1>=124.1455 &
lintang1>=6.2434 & lintang1<=7.8897
    NP='Dabaw, Pilipina';
elseif bujur1<=126.3648 & bujur1>=(-130.957) &
lintang1>=7.8897 & lintang1<=22.6275
    NP='Samudera Pasifik Utara';

%11/05/2097
elseif bujur1<=179.6484 & bujur1>=171.3867 &
lintang1>=35.9484 & lintang1<=40.2907
    NP='Samudera Pasifik Utara';
elseif bujur1<=179.6484 & bujur1>=(-179.9867) &
lintang1>=36.2907 & lintang1<=55.5203
    NP='Samudera Pasifik Utara';
elseif bujur1<=(-146.4258) & bujur1>=(-160.1367) &
lintang1>=55.5203 & lintang1<=70.1055
    NP='Alaska';
elseif bujur1<=13.7549 & bujur1>=(-146.4258) &
lintang1>=70.1055 & lintang1<=86.9007
    NP='Samudera Artik';
elseif bujur1<=19.0283 & bujur1>=13.7549 &
lintang1>=78.0749 & lintang1<=79.9007
    NP='Svalbard';
elseif bujur1<=36.4746 & bujur1>=19.0283 &
lintang1>=68.8859 & lintang1<=78.0749
    NP='Samudera Artik';

%14/09/2099
elseif bujur1<=(-128.6719) & bujur1>=(-145.3711) &
lintang1>=52.2054 & lintang1<=52.398
    NP='Samudera Pasifik Utara';
elseif bujur1<=(-104.1504) & bujur1>=(-128.6719) &
lintang1>=48.9466 & lintang1<=52.2054
    NP='Kanada, Amerika Utara';
elseif bujur1<=(-76.0254) & bujur1>=(-104.1504) &
lintang1>=35.9187 & lintang1<=48.9466
    NP='United State, Amerika Serikat';
elseif bujur1<=(-34.9805) & bujur1>=(-76.0254) &
lintang1>=35.9187 & lintang1<=0.249
    NP='Samudera Atlantik Utara';
elseif bujur1<=(-8.7891) & bujur1>=(-34.9805) &
lintang1>=(-5.667) & lintang1<=0.249
    NP='Samudera Atlantik Utara';

```

```

NP='Samudera Atlantik Selatan';

%04/09/2100
elseif bujur1<=(-13.2056) & bujur1>=(-17.7319) &
lintang1>=8.264 & lintang1<=8.6987
NP='Samudera Atlantik Utara';
elseif bujur1<=(-13.2056) & bujur1>=(-10.5249) &
lintang1>=8.9375 & lintang1<=8.6987
NP='Sierra Leone';
elseif bujur1<=(-7.7563) & bujur1>=(-10.5249) &
lintang1>=8.9375 & lintang1<=9.0677
NP='Guinea';
elseif bujur1<=(-7.7563) & bujur1>=(-2.7466) &
lintang1>=9.1111 & lintang1<=9.0677
NP='Cote d Ivoire';
elseif bujur1<=(-0.4834) & bujur1>=(-2.7466) &
lintang1>=9.1111 & lintang1<=8.9809
NP='Ghana';
elseif bujur1<=(-0.4834) & bujur1>=(-1.626) &
lintang1>=8.9158 & lintang1<=8.9809
NP='Togo';
elseif bujur1<=(2.7686) & bujur1>=(-1.626) &
lintang1>=8.9158 & lintang1<=8.7856
NP='Benin';
elseif bujur1<=(2.7686) & bujur1>=(11.8433) &
lintang1>=7.2626 & lintang1<=8.7856
NP='Cameroon';
elseif bujur1<=(19.0723) & bujur1>=(11.8433) &
lintang1>=7.2626 & lintang1<=4.8812
NP='Afrika Tengah';
elseif bujur1<=(19.0723) & bujur1>=(29.5532) &
lintang1>=1.4189 & lintang1<=4.8812
NP='Kongo';
elseif bujur1<=(30.7398) & bujur1>=(29.5532) &
lintang1>=1.4189 & lintang1<=2.3632
NP='Rwanda';
elseif bujur1<=(30.7398) & bujur1>=(40.4956) &
lintang1>=12.1163 & lintang1<=2.3632
NP='Tanzania';
elseif bujur1<=(44.4287) & bujur1>=(40.4956) &
lintang1>=12.1163 & lintang1<=16.5642
NP='Teluk Mozambique';
elseif bujur1<=(44.4287) & bujur1>=(48.4497) &
lintang1>=20.9939 & lintang1<=16.5642
NP='Madagascar';
elseif bujur1<=(105.6006) & bujur1>=(48.4497) &
lintang1>=20.9939 & lintang1<=47.5555
NP='Samudera India';

else
NP=' - ';
end

```

```

        if ib==0
            dat={num2str(ib), num2str(jam_desimal),
num2str(Bujur), bujurket, Lintang, lintangket, num2str(Azimuth),
num2str(Altitude), num2str(perbandingan_radius_bulan_matahari),
durasi, NP, num2str(lebar_lintasan)};
            set(handles.uitable1,'Data',dat);
        else
            ds=get(handles.uitable1,'Data');
            dat={num2str(ib), num2str(jam_desimal),
num2str(Bujur), bujurket, Lintang, lintangket, num2str(Azimuth),
num2str(Altitude), num2str(perbandingan_radius_bulan_matahari),
durasi, NP, num2str(lebar_lintasan)};
            datr=[ds;dat];
            set(handles.uitable1,'Data',datr);
        end

        if bujur1<0
            bujurg=180-abs(bujur1);
            bujurg1=180+bujurg;
        else
            bujurg1=bujur1;
        end

        ib=ib+1;
        pb(ib)=bujur1;
        pl(ib)=lintang1;
    end
end

if pb==0
    set(handles.tket, 'String','Nilai B bernilai imajiner');
    cla(handles.axes1,'reset');
    set(handles.uipanel4, 'SelectedObject', handles.tabell1);
    set(handles.uitable1,'Visible','on');
    set(handles.axes1,'Visible','off');
    set(handles.uitable1,'Data',[]);
else
    if ket==ib
        set(handles.tket, 'String','Terjadi Gerhana Matahari
Total');
    else
        set(handles.tket, 'String','Tidak Terjadi Gerhana
Matahari Total');
    end

%plot(pb,pl,'b--.');
x111=linspace(-180,180,361);
y111=0*x111;
y112=linspace(-180,180,361);
x112=0*y112;
graf=plot(x111,y111,'-',x112,y112,'-',pb,pl,'.');
set(graf(1), 'LineWidth',2,'Color','k');

```

```

        set(graf(2), 'LineWidth', 2, 'Color', 'k');
        set(graf(3), 'LineWidth', 1, 'Color', 'b');
        axis([-180,180,-90,90]);
        grid minor;
        xlabel('Longitude (Barat Negatif,Timur Positif)');
        ylabel('Latitude (Selatan Negatif,Utara Positif)');
        title('Grafik Posisi (Bujur,Lintang) Geografis yang
Terkena Gerhana Matahari Total');
        grid;
        set(handles.uipanel4, 'SelectedObject', handles.tabell);
        set(handles.uitable1, 'Visible', 'on');
        set(handles.axes1, 'Visible', 'off');
    end
end

% --- Executes on button press in breset.
function breset_Callback(hObject, eventdata, handles)
% hObject    handle to breset (see GCBO)
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
A=0;
cla(handles.axes1, 'reset');
set(handles.uipanel4, 'SelectedObject', handles.tabell);
set(handles.uitable1, 'Visible', 'on');
set(handles.axes1, 'Visible', 'off');
set(handles.uitable1, 'Data', []);
set(handles.tket, 'String', '-');
set(handles.menutanggal, 'Value', 1);

% --- Executes when entered data in editable cell(s) in uitable1.
function uitable1_CellEditCallback(hObject, eventdata, handles)
% hObject    handle to uitable1 (see GCBO)
% eventdata   structure with the following fields (see UITABLE)
%   Indices: row and column indices of the cell(s) edited
%   PreviousData: previous data for the cell(s) edited
%   EditData: string(s) entered by the user
%   NewData: EditData or its converted form set on the Data
property. Empty if Data was not changed
%   Error: error string when failed to convert EditData to
appropriate value for Data
% handles    structure with handles and user data (see GUIDATA)

% --- Executes on key press with focus on uitable1 and none of its
controls.
function uitable1_KeyPressFcn(hObject, eventdata, handles)
% hObject    handle to uitable1 (see GCBO)
% eventdata   structure with the following fields (see UITABLE)
%   Key: name of the key that was pressed, in lower case
%   Character: character interpretation of the key(s) that was
pressed
%   Modifier: name(s) of the modifier key(s) (i.e., control,
shift) pressed

```

```
% handles      structure with handles and user data (see GUIDATA)

% --- Executes when selected object is changed in uipanel4.
function uipanel4_SelectionChangeFcn(hObject, eventdata, handles)
% hObject    handle to the selected object in uipanel4
% eventdata   structure with the following fields (see
% UIBUTTONGROUP)
%   EventName: string 'SelectionChanged' (read only)
%   OldValue: handle of the previously selected object or empty if
none was selected
%   NewValue: handle of the currently selected object
% handles      structure with handles and user data (see GUIDATA)
if ((hObject == handles.tabell1)
    set(handlesuitable1,'Visible','on');
    set(handles.axes1,'Visible','off');
else
    set(handles.axes1,'Visible','on');
    set(handlesuitable1,'Visible','off');
end

% --- Executes on mouse press over figure background, over a
disabled or
% --- inactive control, or over an axes background.
function figure1_WindowButtonDownFcn(hObject, eventdata, handles)
% hObject    handle to figure1 (see GCBO)
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles      structure with handles and user data (see GUIDATA)

% --- Executes on selection change in menutanggal.
function menutanggal_Callback(hObject, eventdata, handles)
% hObject    handle to menutanggal (see GCBO)
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles      structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns
menutanggal contents as cell array
%         contents{get(hObject,'Value')} returns selected item from
menutanggal

% --- Executes during object creation, after setting all
properties.
function menutanggal_CreateFcn(hObject, eventdata, handles)
% hObject    handle to menutanggal (see GCBO)
% eventdata   reserved - to be defined in a future version of
MATLAB
% handles      empty - handles not created until after all
CreateFcns called
```

```
% Hint: popupmenu controls usually have a white background on
Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
set(hObject, 'String', {'<none>', '9 Maret 2016', '21 Agustus
2017', '2 Juli 2019', '14 Desember 2020', '4 Desember 2021', '8
April 2024', '12 Agustus 2026', '2 Agustus 2027', '22 Juli 2028',
'25 November 2030', '30 Maret 2033', '20 Maret 2034', '2 September
2035', '13 Juli 2037', '26 Desember 2038', '15 Desember 2039', '30
April 2041', '20 April 2042', '23 Agustus 2044', '12 Agustus
2045', '2 Agustus 2046', '5 Desember 2048', '30 Maret 2052', '12
September 2053', '24 Juli 2055', '5 Januari 2057', '26 Desember
2057', '11 Mei 2059', '30 April 2060', '20 April 2061', '24
Agustus 2063', '12 Agustus 2064', '17 Desember 2066', '31 Mei
2068', '11 April 2070', '23 September 2071', '12 September 2072',
'3 Agustus 2073', '16 Januari 2075', '6 Januari 2076', '22 Mei
2077', '11 Mei 2078', '1 Mei 2079', '3 September 2081', '24
Agustus 2082', '27 Desember 2084', '11 Juni 2086', '21 April
2088', '4 Oktober 2089', '23 September 2090', '15 Agustus 2091',
'27 Januari 2093', '16 Januari 2094', '2 Juni 2095', '22 Mei
2096', '11 Mei 2097', '14 September 2099', '4 September 2100'});
```

```
% -----
function uitable1_ButtonDownFcn(hObject, eventdata, handles)
% hObject    handle to uitable1 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
```



```
% --- Executes when uipanel4 is resized.
function uipanel4_ResizeFcn(hObject, eventdata, handles)
% hObject    handle to uipanel4 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
```

B. Tampilan Hasil Pemrograman Prediksi Gerhana Matahari Total dari Tahun 2016-2100

Berikut beberapa tampilan Prediksi Gerhana Matahari Total dari Tahunn

2016-2100 menggunakan *software* Matlab :

1. Tampilan Prediksi Gerhana Matahari Total 09 Maret 2016 Menggunakan *Software* Matlab

The screenshot shows a MATLAB-based application window titled "Waktu dan Tempat Terjadi Gerhana". The main title bar says "*** PREDIKSI GERHANA MATAHARI TOTAL TAHUN 2016-2100 ***". Below the title, there are two input fields: "Tanggal:" containing "9 Maret 2016" and "Keterangan:" containing "Terjadi Gerhana Matahari Total". To the right of these fields are two radio buttons: "TABEL" (selected) and "GRAFIK". Further right are buttons for "Check" and "Reset". The main content area is a large table with the following columns: No, Waktu(UT), Bujur, Ket.Bujur, Lintang, Ket.Lintang, Azimuth Matahari, Altitude Matahari, Perbandingan Rb dan Rm, Durasi(Menit:Ditik), Nama Wilayah, and Lebar Lintata. The table lists approximately 22 entries, each corresponding to a specific date and location where a total solar eclipse will occur.

No	Waktu(UT)	Bujur	Ket.Bujur	Lintang	Ket.Lintang	Azimuth Matahari	Altitude Matahari	Perbandingan Rb dan Rm	Durasi(Menit:Ditik)	Nama Wilayah	Lebar Lintata
0	01:17.0	92:33:14	Positif	2:32:43	Negatif	94:13:46	4:20:53	1.0282	1:37:413	Samudera India	98.4809
1	01:18.0	96:53:57	Positif	2:43:59	Negatif	94:2:3	8:56:25	1.0297	1:46.4501	Samudera India	103.673
2	01:19.0	99:35:38	Positif	2:47:30	Negatif	93:55:7	11:52:42	1.0306	1:52.3089	Kepulauan Mentawai	107.0006
3	02:00.0	101:42:0	Positif	2:48:14	Negatif	93:50:15	14:13:38	1.0313	1:57.1495	Sumatera Selatan	109.6573
4	02:10.0	103:28:29	Positif	2:47:21	Negatif	93:46:44	16:14:39	1.032	2:1.415	Sumatera Selatan	111.9326
5	02:20.0	105:1:47	Positif	2:45:25	Negatif	93:44:16	18:2:28	1.0325	2.5.297	Sumatera Selatan	113.9522
6	02:30.0	106:25:30	Positif	2:42:42	Negatif	93:42:39	19:40:42	1.033	2.8.8989	Pulau Bangka	115.7842
7	02:40.0	107:41:53	Positif	2:39:23	Negatif	93:41:47	21:11:34	1.0335	2:12.2841	Pulau Belitung	117.4705
8	02:50.0	108:52:23	Positif	2:35:35	Negatif	93:41:35	22:36:34	1.0339	2:15.4946	Laut Jawa	119.0388
9	02:56.0	109:58:2	Positif	2:31:22	Negatif	93:42:1	23:56:43	1.0343	2:18.5599	Laut Jawa	120.5088
10	02:27.0	110:59:39	Positif	2:26:49	Negatif	93:43:1	25:12:47	1.0347	2:21.5019	Kalimantan Tengah	121.8951
11	02:28.0	111:57:46	Positif	2:21:57	Negatif	93:44:35	26:25:23	1.035	2:24.3369	Kalimantan Tengah	123.2086
12	02:29.0	112:52:53	Positif	2:16:50	Negatif	93:46:40	27:34:57	1.0353	2:27.0777	Kalimantan Tengah	124.458
13	03:00.0	113:45:20	Positif	2:11:30	Negatif	93:49:15	28:41:51	1.0357	2:29.7345	Kalimantan Tengah	125.6502
14	03:10.0	114:35:26	Positif	2:5:56	Negatif	93:52:20	29:46:24	1.036	2:32.3156	Kalimantan Tengah	126.7907
15	03:20.0	115:23:26	Positif	2:0:12	Negatif	93:55:55	30:48:49	1.0363	2:34.8276	Kalimantan Tengah	127.8844
16	03:30.0	116:9:32	Positif	1:54:17	Negatif	93:59:58	31:49:20	1.0365	2:37.2763	Kalimantan Tengah	128.9349
17	03:40.0	116:53:55	Positif	1:48:13	Negatif	94:4:30	32:48:7	1.0368	2:39.6664	Selat Makasar	129.9457
18	03:50.0	117:36:44	Positif	1:42:0	Negatif	94:9:30	33:45:19	1.0371	2:42.0018	Selat Makasar	130.9195
19	03:60.0	118:18:6	Positif	1:35:40	Negatif	94:14:59	34:41:3	1.0373	2:44.2861	Selat Makasar	131.8588
20	03:70.0	118:58:9	Positif	1:29:12	Negatif	94:20:56	35:35:27	1.0376	2:46.5221	Selat Makasar	132.7657
21	03:80.0	119:36:59	Positif	1:22:36	Negatif	94:27:21	36:28:36	1.0378	2:48.7125	Sulawesi Tengah	133.642
22	03:90.0	120:14:41	Positif	1:15:55	Negatif	94:34:14	37:20:36	1.038	2:50.8595	Sulawesi Tengah	134.4894

Gambar 4.1 Prediksi Gerhana Matahari Total 09 Maret 2016 Menggunakan *Software* Matlab

Waktu dan Tempat Terjadi Gerhana

***** PREDIKSI GERHANA MATAHARI TOTAL TAHUN 2016-2100 *****

<i>Tanggal:</i>		<i>Keterangan:</i>		Terjadi Gerhana Matahari Total										<input checked="" type="radio"/> TABEL	<input type="radio"/> GRAFIK	Check
9 Maret 2016														<input checked="" type="radio"/>	<input type="radio"/>	Reset
No	Waktu(UT)	Bujur	Ket.Bujur	Lintang	Ket.Lintang	Azimuth Matahari	Altitude Matahari	Perbandingan Rb dan Rm	Durasi(Menit:Ddetik)	Nama Wilayah	Lebar Lintasa					
161	2:58:0	169:10:12	Positif	21:28:22	Positif	233:16:58	50:54:7	1.0416	3:22.9825	Samudera Pasifik Utara	140.7314					
162	2:59:0	169:37:58	Positif	21:41:6	Positif	233:48:32	49:26:14	1.0415	3:21.454	Samudera Pasifik Utara	140.2913					
163	3:00	170:6:14	Positif	21:53:56	Positif	234:19:51	48:46:11	1.0413	3:19.8985	Samudera Pasifik Utara	139.8408					
164	3:10	170:35:1	Positif	22:6:49	Positif	234:50:57	48:5:38	1.0412	3:18.3157	Samudera Pasifik Utara	139.3796					
165	3:20	171:42:23	Positif	22:19:48	Positif	235:21:54	47:24:32	1.041	3:16.7051	Samudera Pasifik Utara	138.9074					
166	3:30	171:34:19	Positif	22:32:51	Positif	235:52:42	46:42:53	1.0409	3:15.0664	Samudera Pasifik Utara	138.4238					
167	3:40	172:45:2	Positif	22:46:0	Positif	236:23:23	46:0:40	1.0407	3:13.3989	Samudera Pasifik Utara	137.9283					
168	3:50	172:36:4	Positif	22:59:13	Positif	236:54:1	45:17:51	1.0406	3:11.7023	Samudera Pasifik Utara	137.4205					
169	3:60	173:7:56	Positif	23:12:32	Positif	237:24:35	44:34:25	1.0404	3:09.9759	Samudera Pasifik Utara	136.8998					
170	3:70	173:40:31	Positif	23:25:56	Positif	237:55:10	43:50:20	1.0403	3:08.2191	Samudera Pasifik Utara	136.3657					
171	3:80	174:13:52	Positif	23:39:27	Positif	238:25:47	43:5:34	1.0401	3:06.4311	Samudera Pasifik Utara	135.8177					
172	3:90	174:48:0	Positif	23:53:3	Positif	238:56:27	42:20:5	1.0399	3:04.6112	Samudera Pasifik Utara	135.2551					
173	3:10:0	175:22:59	Positif	24:6:45	Positif	239:27:14	41:33:51	1.0397	3:02.7584	Samudera Pasifik Utara	134.6772					
174	3:11:0	175:58:52	Positif	24:20:34	Positif	239:58:10	40:46:49	1.0396	3:00.8719	Samudera Pasifik Utara	134.0832					
175	3:12:0	176:35:41	Positif	24:34:30	Positif	240:29:17	39:58:58	1.0394	2:58.9504	Samudera Pasifik Utara	133.4725					
176	3:13:0	177:13:31	Positif	24:48:33	Positif	241:0:38	39:10:13	1.0392	2:56.9928	Samudera Pasifik Utara	132.844					
177	3:14:0	177:52:26	Positif	25:2:44	Positif	241:32:15	38:20:32	1.039	2:54.9977	Samudera Pasifik Utara	132.1968					
178	3:15:0	178:32:30	Positif	25:17:2	Positif	242:41:3	37:29:52	1.0388	2:52.9635	Samudera Pasifik Utara	131.5298					
179	3:16:0	179:13:48	Positif	25:31:28	Positif	242:36:33	36:38:7	1.0386	2:50.8886	Samudera Pasifik Utara	130.8419					
180	3:17:0	179:56:25	Positif	25:46:4	Positif	243:9:20	35:45:15	1.0383	2:48.7708	-	130.1315					
181	3:18:0	179:19:31	Negatif	26:0:48	Positif	243:42:38	34:51:8	1.0381	2:46.608	Samudera Pasifik Utara	129.3974					
182	3:19:0	178:33:55	Negatif	26:15:43	Positif	244:16:30	33:55:43	1.0379	2:44.3977	Samudera Pasifik Utara	128.6376					
183	3:20:0	177:46:38	Negatif	26:30:48	Positif	244:51:2	32:58:52	1.0376	2:42.1367	Samudera Pasifik Utara	127.8504					

Gambar 4.1 (Lanjutan)

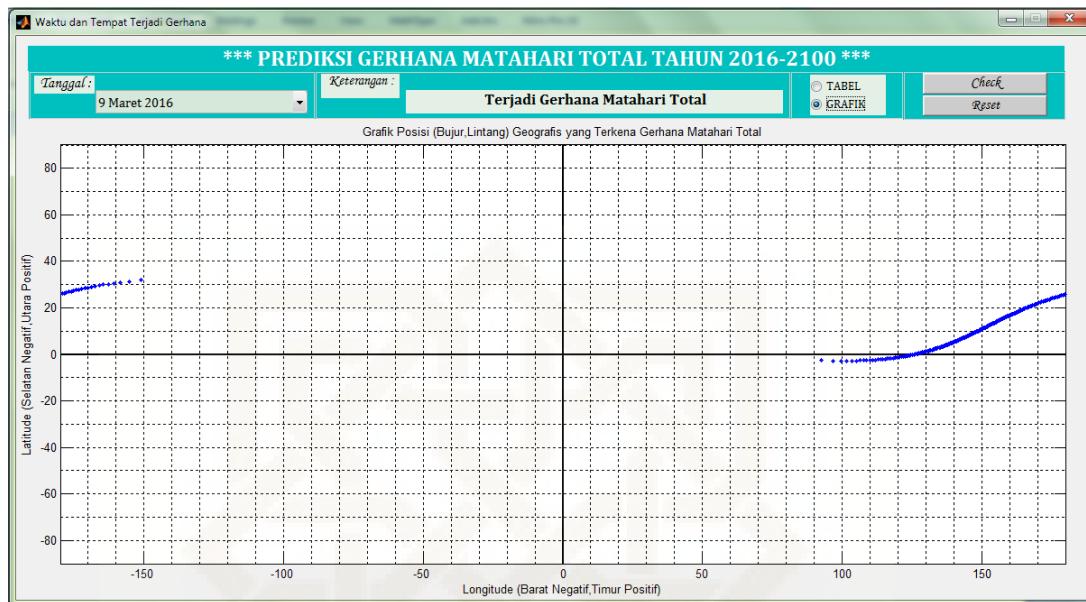
Waktu dan Tempat Terjadi Gerhana

***** PREDIKSI GERHANA MATAHARI TOTAL TAHUN 2016-2100 *****

<i>Tanggal:</i>		<i>Keterangan:</i>		Terjadi Gerhana Matahari Total										<input checked="" type="radio"/> TABEL	<input type="radio"/> GRAFIK	Check
9 Maret 2016														<input checked="" type="radio"/>	<input type="radio"/>	Reset
No	Waktu(UT)	Bujur	Ket.Bujur	Lintang	Ket.Lintang	Azimuth Matahari	Altitude Matahari	Perbandingan Rb dan Rm	Durasi(Menit:Ddetik)	Nama Wilayah	Lebar Lintasa					
178	3:15:0	178:32:30	Positif	25:17:2	Positif	242:4:13	37:29:52	1.0388	2:52.9635	Samudera Pasifik Utara	131.5298					
179	3:16:0	179:13:48	Positif	25:31:28	Positif	242:36:33	36:38:7	1.0386	2:50.8886	Samudera Pasifik Utara	130.8419					
180	3:17:0	179:56:25	Positif	25:46:4	Positif	243:9:20	35:45:15	1.0383	2:48.7708	-	130.1315					
181	3:18:0	179:19:31	Negatif	26:0:48	Positif	243:42:38	34:51:8	1.0381	2:46.608	Samudera Pasifik Utara	129.3974					
182	3:19:0	178:33:55	Negatif	26:15:43	Positif	244:16:30	33:55:43	1.0379	2:44.3977	Samudera Pasifik Utara	128.6376					
183	3:20:0	177:46:38	Negatif	26:30:48	Positif	244:51:2	32:58:52	1.0376	2:42.1367	Samudera Pasifik Utara	127.8504					

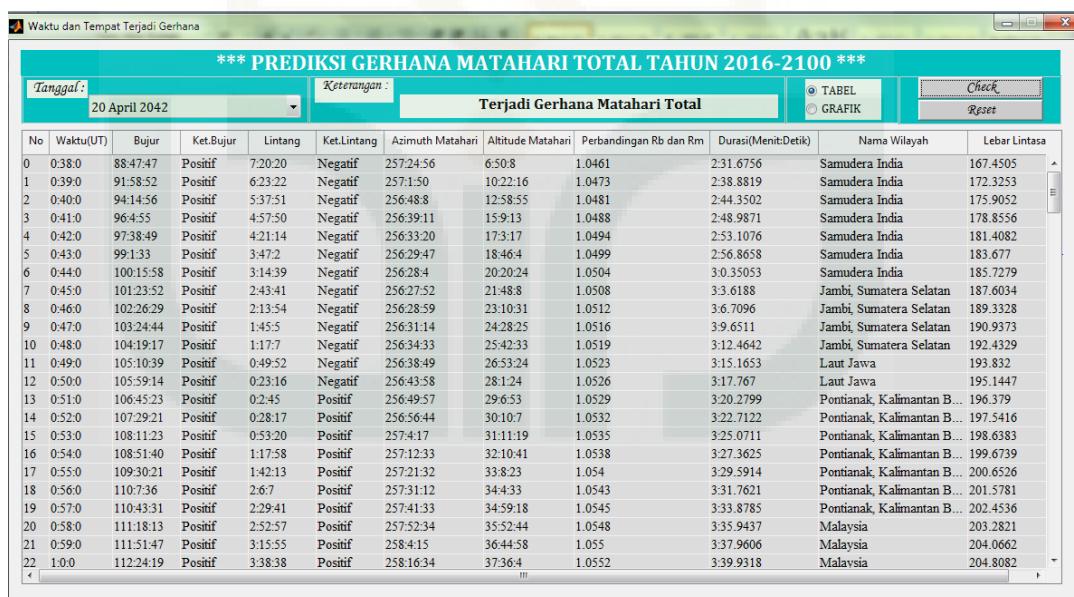
Gambar 4.1 (Lanjutan)

2. Prediksi Gerhana Matahari Total 09 Maret 2016 Menggunakan Software Matlab



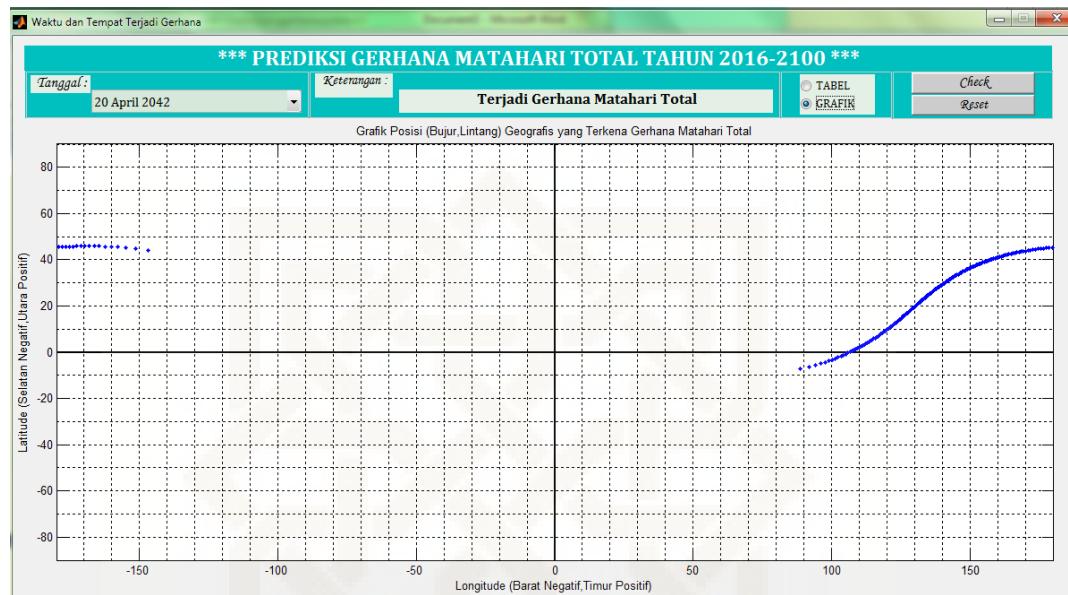
Gambar 4.2 Prediksi Gerhana Matahari Total 09 Maret 2016 Menggunakan Software Matlab

3. Prediksi Gerhana Matahari Total 20 April 2042 Menggunakan Software Matlab



Gambar 4.3 Prediksi Gerhana Matahari Total 20 April 2042 Menggunakan Software Matlab

4. Grafik Wilayah atau Posisi Geografis yang dilalui Gerhana Matahari Total 20 April 2042



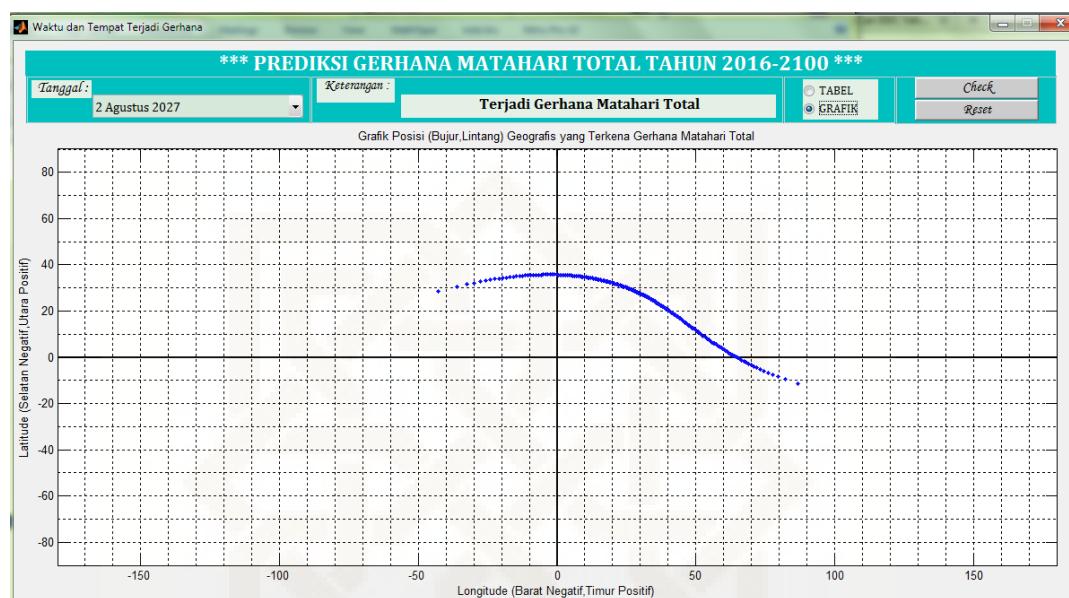
Gambar 4.4 Grafik Wilayah atau Posisi Geografis yang dilalui Gerhana Matahari Total 20 April 2042

5. Prediksi Gerhana Matahari Total 02 Agustus 2027 Menggunakan Software Matlab

No	Waktu(UT)	Bujur	Ket.Bujur	Lintang	Ket.Lintang	Azimuth Matahari	Altitude Matahari	Perbandingan Rb dan Rm	Durasi(Menit:Dekit)	Nama Wilayah	Lebar Lintasa
0	8:25:0	42:56:16	Negatif	28:26:25	Positif	250:29:58	1:25:53	1.0607	3:9.1704	Samudera Atlantik Utara	207.0813
1	8:26:0	35:56:12	Negatif	30:33:17	Positif	254:4:54	8:5:6	1.0629	3:25.2743	Samudera Atlantik Utara	213.2493
2	8:27:0	32:31:48	Negatif	31:28:57	Positif	255:58:54	11:21:7	1.064	3:33.685	Samudera Atlantik Utara	216.1469
3	8:28:0	29:54:41	Negatif	32:8:43	Positif	257:30:48	13:52:35	1.0648	3:40.4012	Samudera Atlantik Utara	218.3245
4	8:29:0	27:42:17	Negatif	32:40:3	Positif	258:51:12	16:04:48	1.0654	3:46.2284	Samudera Atlantik Utara	220.1261
5	8:30:0	25:45:44	Negatif	33:5:53	Positif	260:4:13	17:54:8	1.066	3:51.4823	Samudera Atlantik Utara	221.6866
6	8:31:0	24:0:28	Negatif	33:27:46	Positif	261:12:1	19:36:53	1.0666	3:56.3255	Samudera Atlantik Utara	223.0759
7	8:32:0	22:23:47	Negatif	33:46:37	Positif	262:15:50	21:11:38	1.0671	4:0.85466	Samudera Atlantik Utara	224.3357
8	8:33:0	20:53:52	Negatif	34:3:31	Positif	263:16:31	22:40:4	1.0675	4:5.1327	Samudera Atlantik Utara	225.4932
9	8:34:0	19:29:32	Negatif	34:17:24	Positif	264:14:38	24:3:19	1.068	4:9.2032	Samudera Atlantik Utara	226.5672
10	8:35:0	18:9:52	Negatif	34:30:4	Positif	265:10:37	25:22:16	1.0683	4:13.0978	Samudera Atlantik Utara	227.5716
11	8:36:0	16:54:12	Negatif	34:41:15	Positif	266:4:46	26:37:32	1.0687	4:16.8405	Samudera Atlantik Utara	228.5167
12	8:37:0	15:42:0	Negatif	34:51:7	Positif	266:57:21	27:49:38	1.0691	4:20.4495	Samudera Atlantik Utara	229.4107
13	8:38:0	14:32:51	Negatif	34:59:51	Positif	267:48:33	28:58:57	1.0694	4:23.9395	Samudera Atlantik Utara	230.2598
14	8:39:0	13:26:25	Negatif	35:7:32	Positif	268:38:31	30:5:48	1.0697	4:27.3223	Samudera Atlantik Utara	231.0694
15	8:40:0	12:22:26	Negatif	35:14:17	Positif	269:27:25	31:10:28	1.07	4:30.6073	Samudera Atlantik Utara	231.8436
16	8:41:0	11:20:38	Negatif	35:20:11	Positif	90:15:20	32:13:9	1.0703	4:33.8025	Samudera Atlantik Utara	232.5861
17	8:42:0	10:20:51	Negatif	35:25:18	Positif	91:2:22	33:14:4	1.0706	4:36.9147	Samudera Atlantik Utara	233.2997
18	8:43:0	9:22:55	Negatif	35:29:41	Positif	91:48:36	34:13:21	1.0709	4:39.9494	Samudera Atlantik Utara	233.987
19	8:44:0	8:26:40	Negatif	35:33:24	Positif	92:34:7	35:11:8	1.0712	4:42.9115	Samudera Atlantik Utara	234.6503
20	8:45:0	7:32:0	Negatif	35:36:29	Positif	93:18:59	36:7:34	1.0714	4:45.8052	Samudera Atlantik Utara	235.2914
21	8:46:0	6:38:47	Negatif	35:39:0	Positif	94:3:14	37:2:44	1.0717	4:48.6339	Samudera Atlantik Utara	235.9119
22	8:47:0	5:46:56	Negatif	35:40:57	Positif	94:46:55	37:56:43	1.0719	4:51.4009	Maroko	236.5132

Gambar 4.5 Prediksi Gerhana Matahari Total 02 Agustus 2027 Menggunakan Software Matlab

6. Grafik Wilayah atau Posisi Geografis yang dilalui Gerhana Matahari Total
tanggal 09 Maret 2016



Gambar 4.2 Grafik Wilayah atau Posisi Geografis yang dilalui Gerhana Matahari Total tanggal 09 Maret 2016