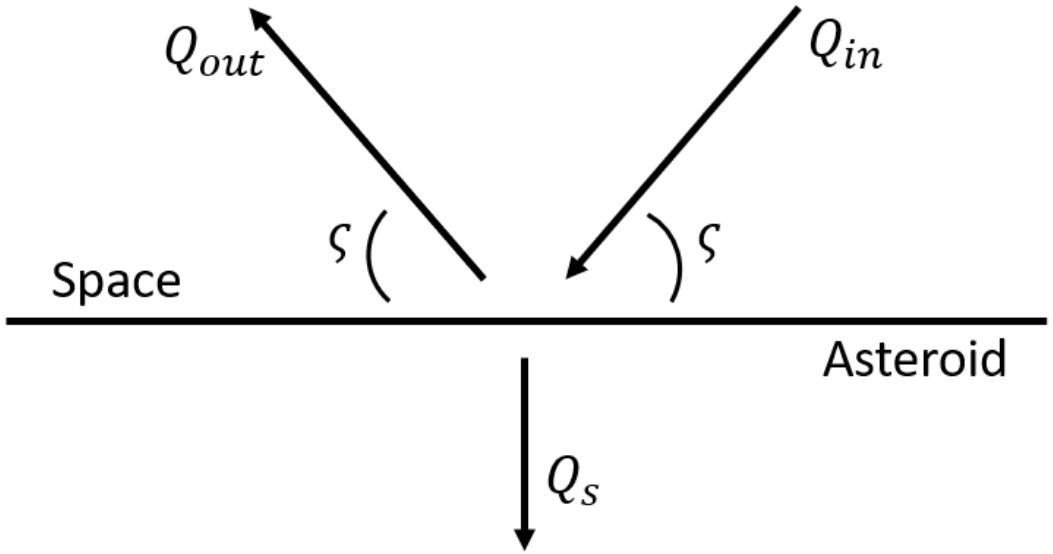
THERMAL MODEL



$$\begin{cases} A = 0.07 \\ \epsilon = 0.9 \\ \rho = 2146\, kg.m^{-3} \\ c = 600\, J.K^{-1} \end{cases}$$

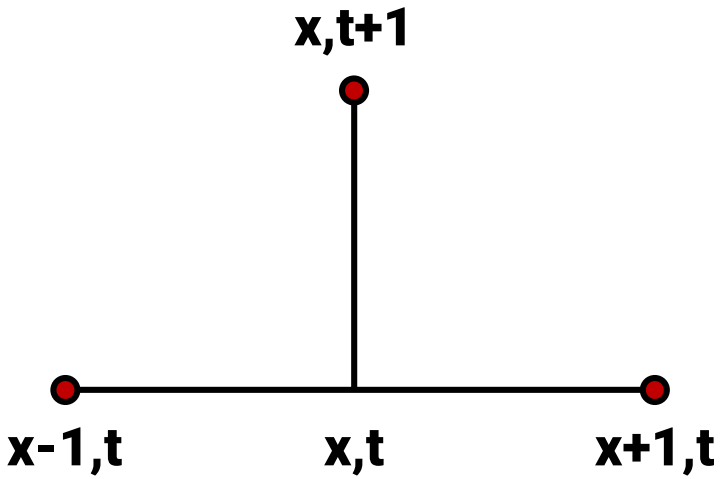
$$\begin{cases} u(x,0) = f(x), & \forall x \in [0, l_s] \\ u_x(0,t) = \dfrac{Q_{out} - Q_{in}}{k} & \forall t \geq 0 \\ u_x(ls,t) = 0, & \forall t \geq 0 \end{cases}$$

$$l_s = \sqrt{\alpha \pi p} \qquad \Gamma = \sqrt{k \rho c}$$

$$Q_{in} = \frac{S_\odot (1 - A) \cos \varsigma}{r^2}$$

$$Q_{out} = \epsilon \sigma u^4$$

NUMERICAL METHOD

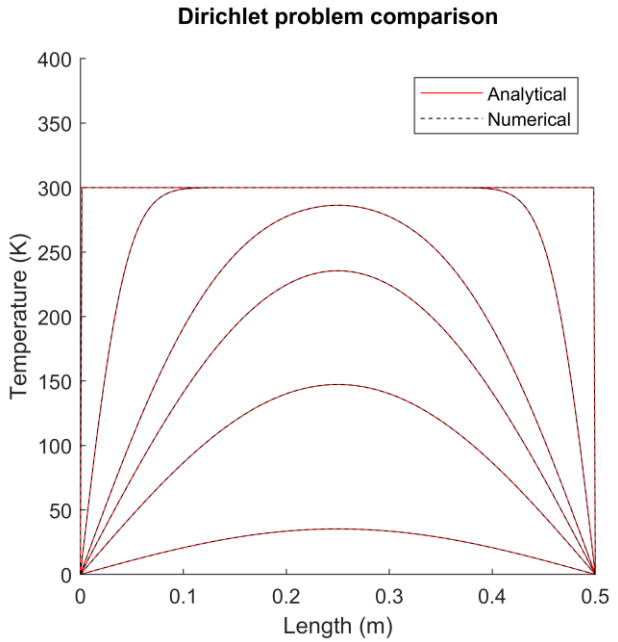


$$u_t = \alpha u_{xx}$$

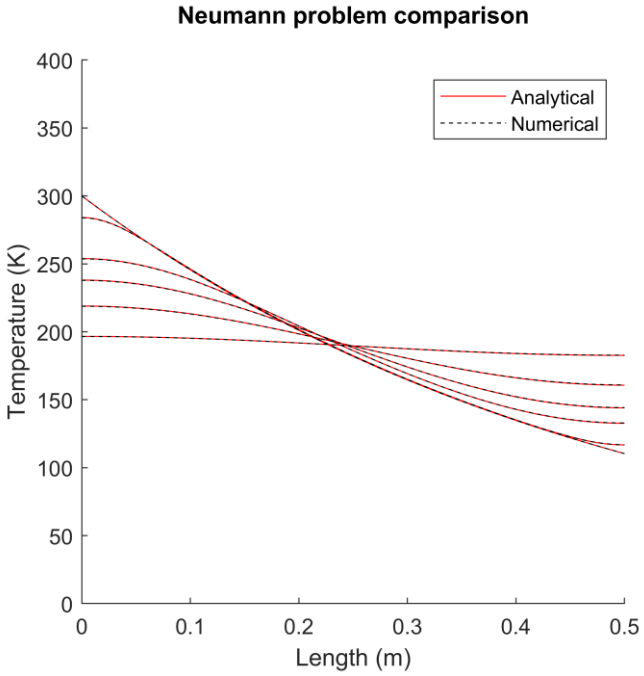
$$u(x, t + \Delta t) = S(u(x - \Delta x, t) + u(x + \Delta x, t)) + (1 - 2S)u(x, t)$$

$$S = \alpha \frac{\Delta t}{\Delta x^2} \leq 0.25$$

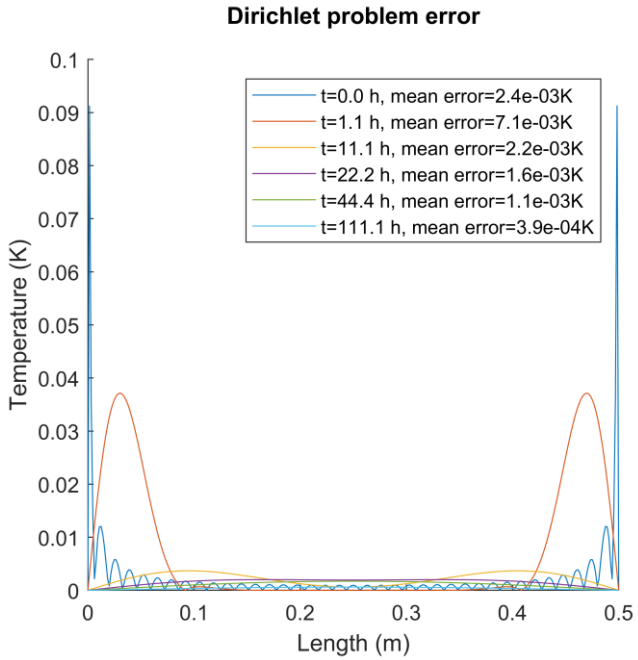
VALIDATIONS

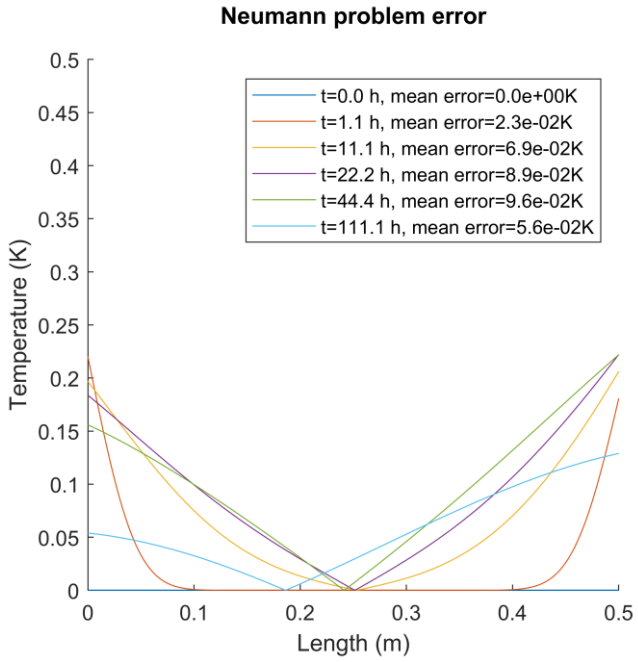


$$\begin{cases} u(x,0) = f(x), & \forall x \in [0, L] \\ u(0,t) = u(L,t) = 0, & \forall t \geq 0 \end{cases}$$



$$\begin{cases} u(x,0) = f(x), & \forall x \in [0, L] \\ u_x(0,t) = u_x(L,t) = 0, & \forall t \geq 0 \end{cases}$$



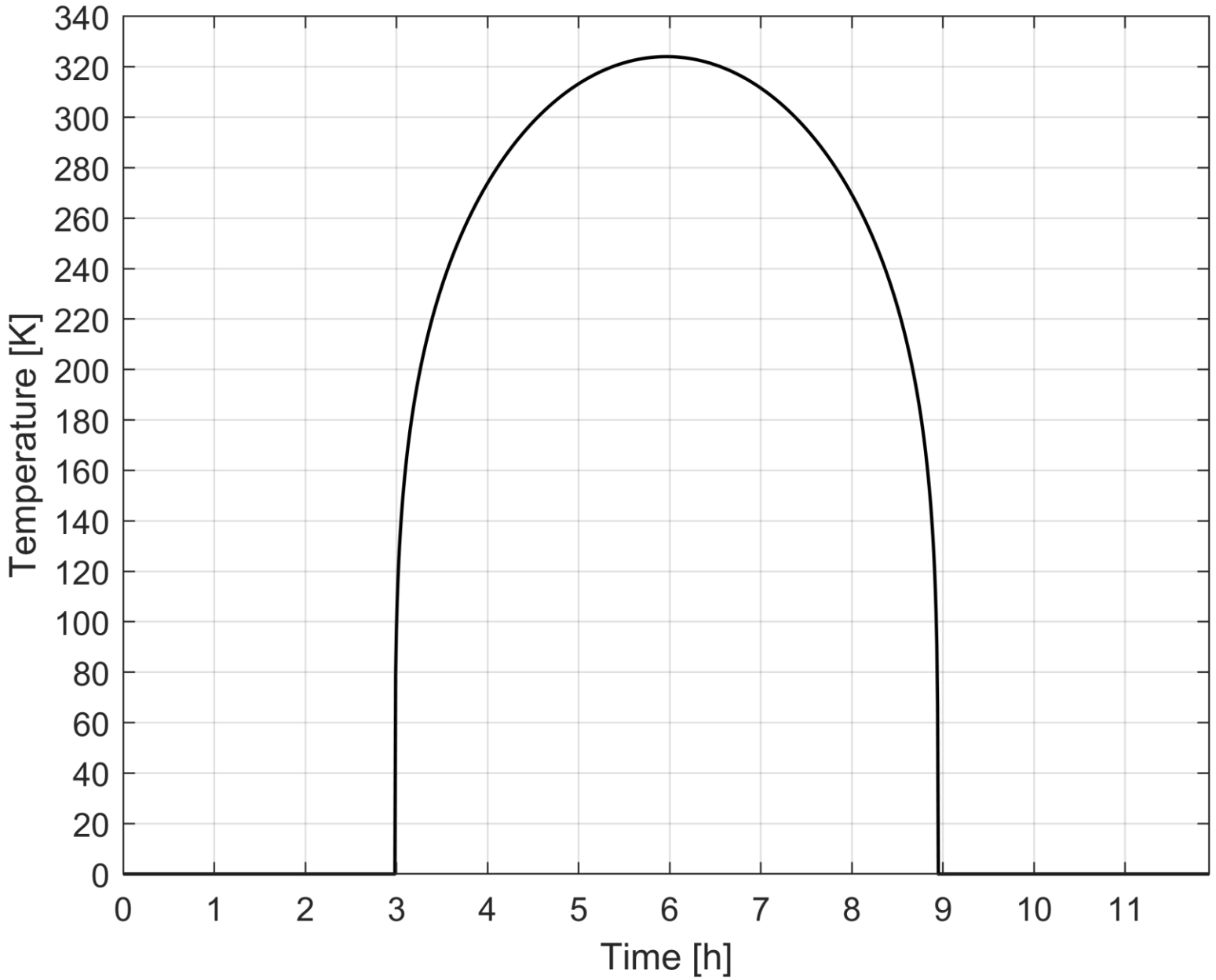


VALIDATIONS

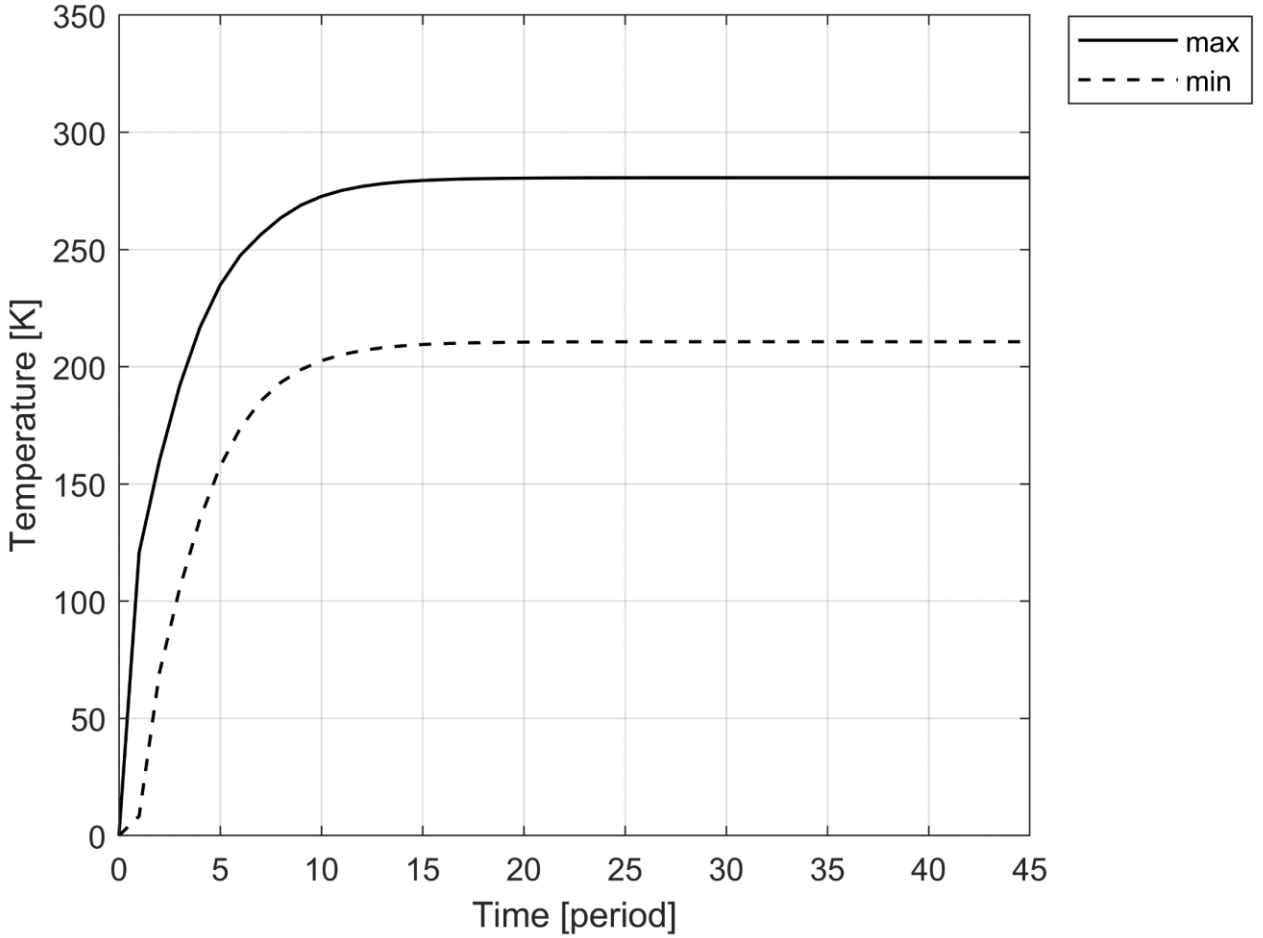
$$\begin{cases} u(x,0) = f(x), & \forall x \in [0, L] \\ u(0,t) = u(L,t) = 0, & \forall t \geq 0 \end{cases}$$

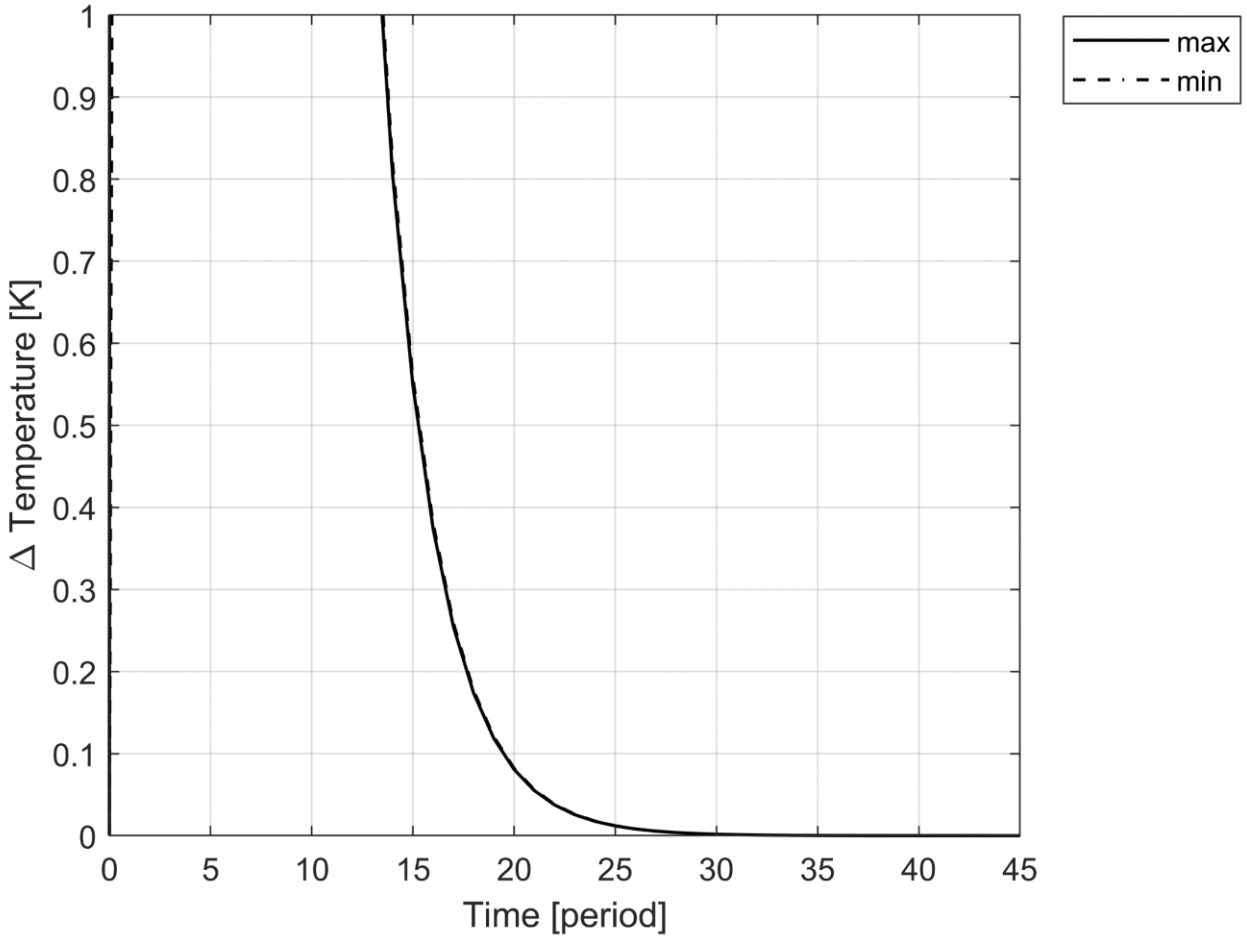
$$\begin{cases} u(x,0) = f(x), & \forall x \in [0, L] \\ u_x(0,t) = u_x(L,t) = 0, & \forall t \geq 0 \end{cases}$$

RESULTS

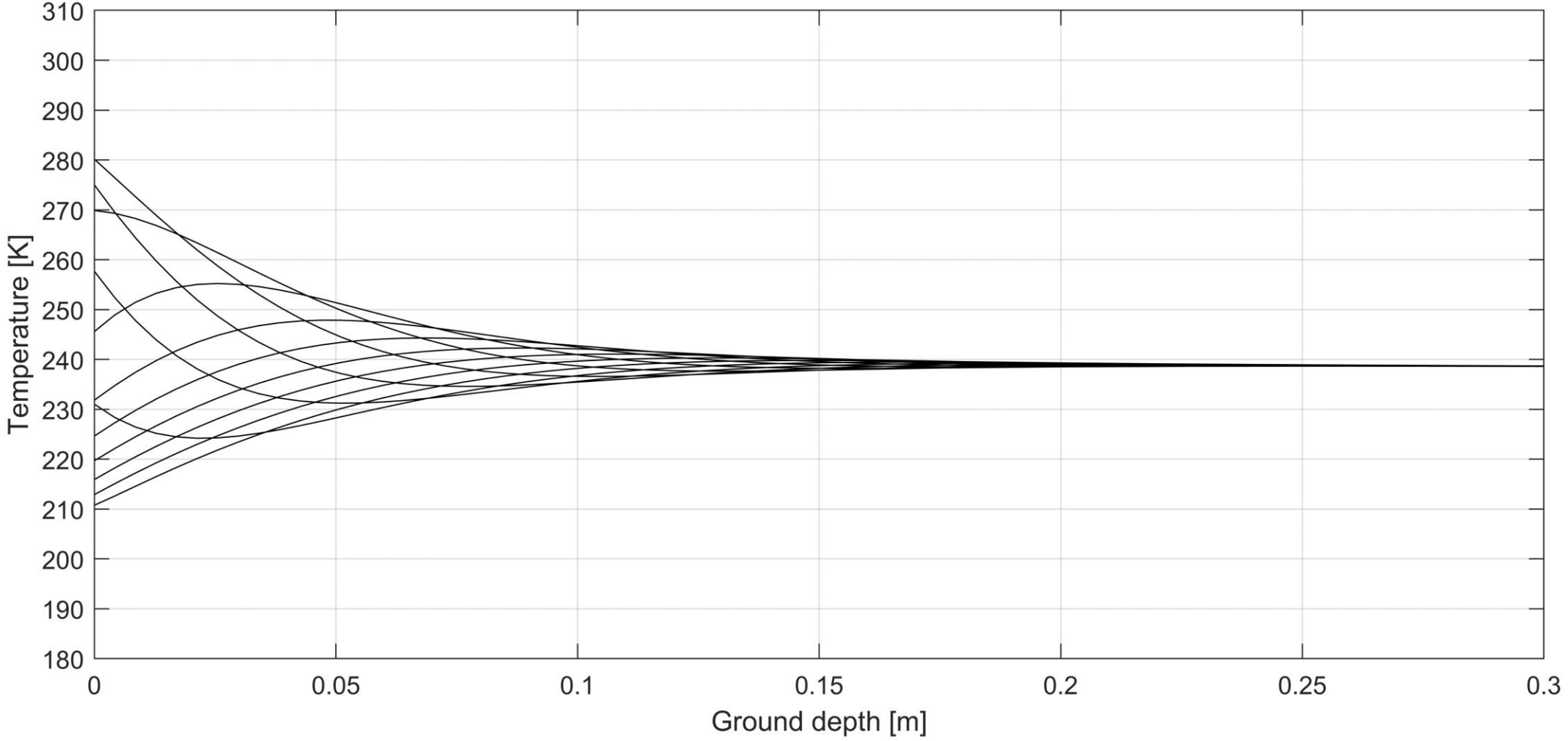

Temperature [K]
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
0
1
2
3
4
5
6
7
8
9
10
11
Time [h]

RESULTS

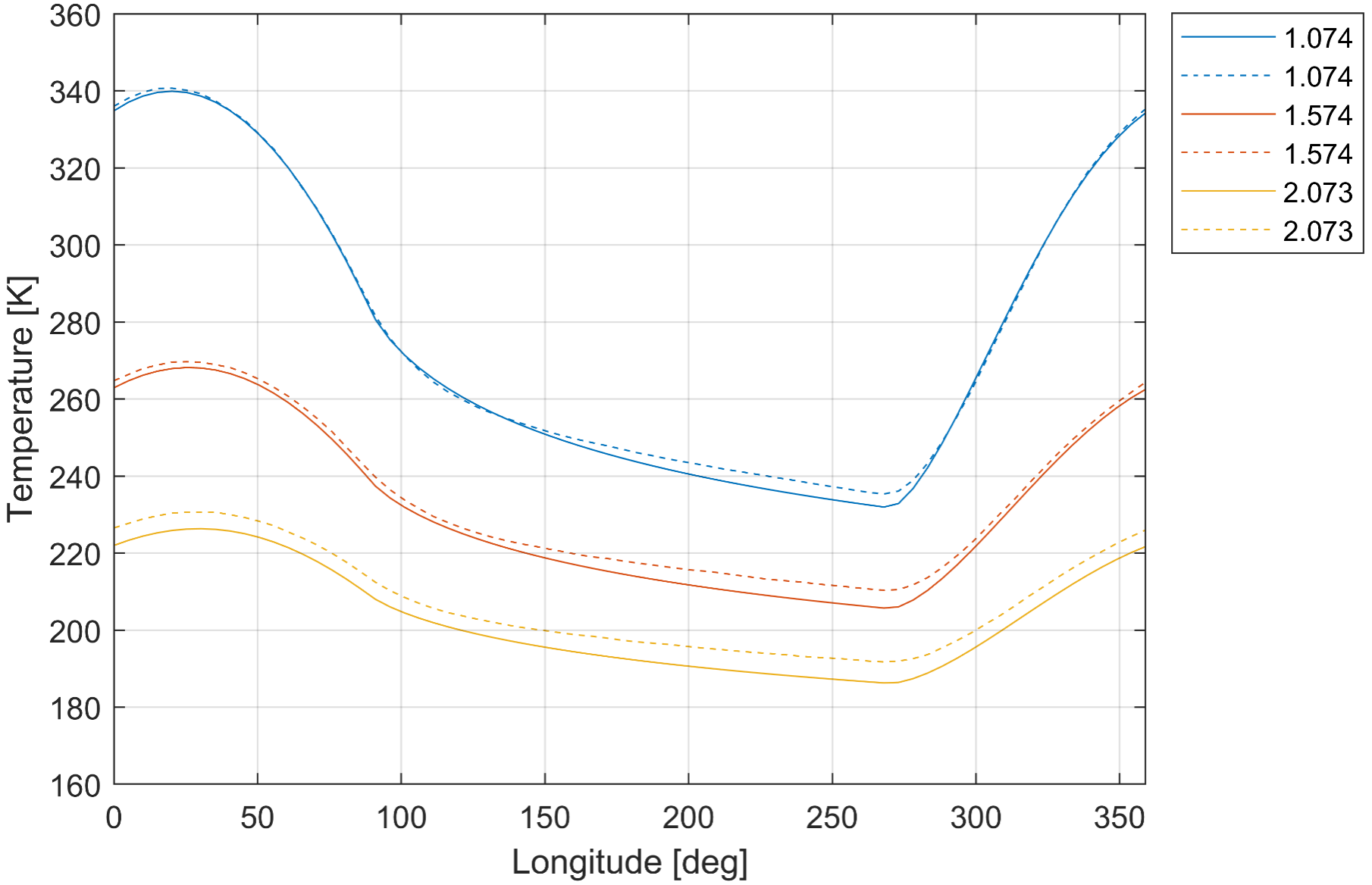

max
min
Temperature [K]
Time [period]
0
50
100
150
200
250
300
350
0
5
10
15
20
25
30
35
40
45


max
min
Δ Temperature [K]
Time [period]
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
5
10
15
20
25
30
35
40
45

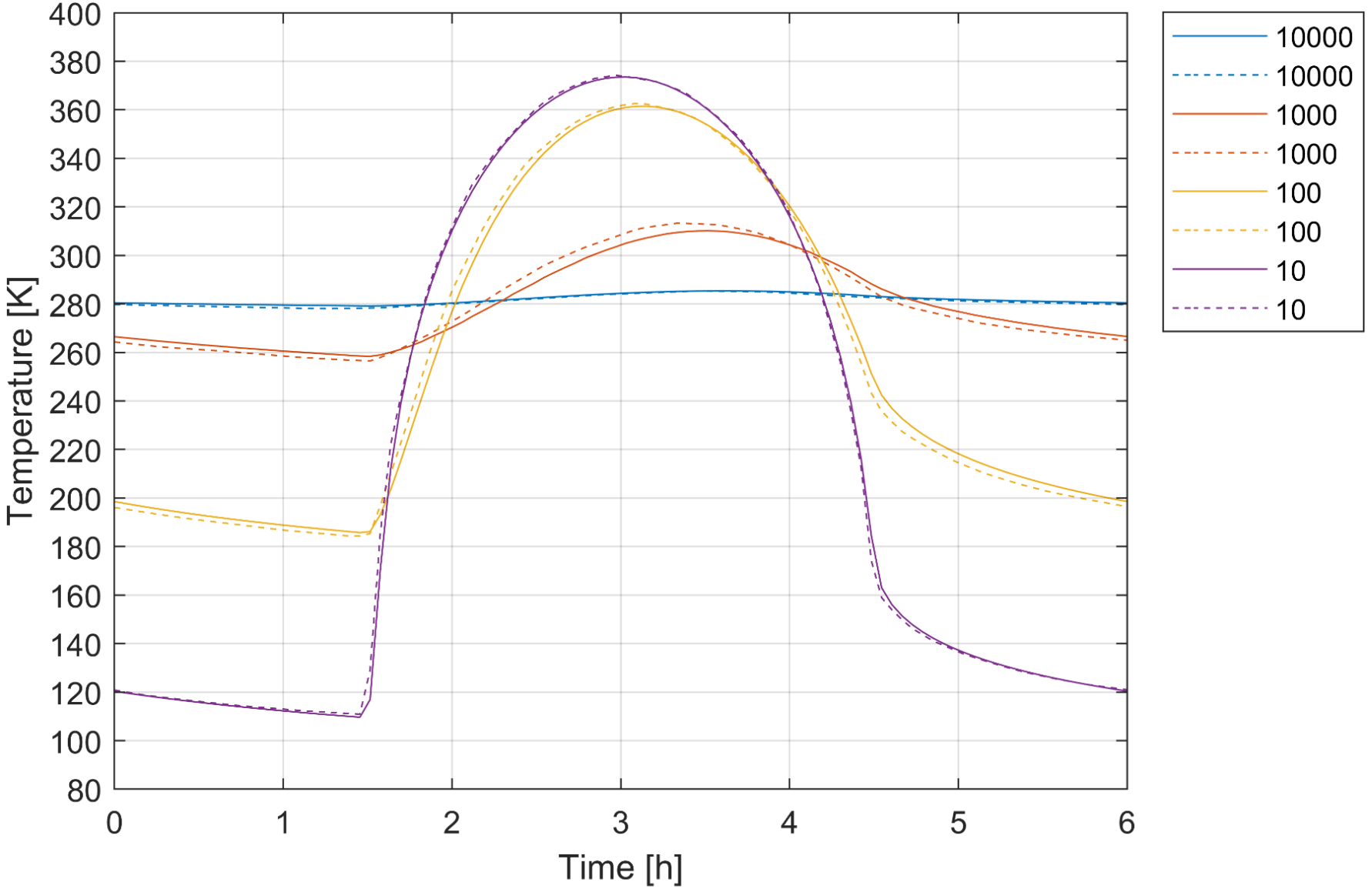
RESULTS


Temperature [K]
310
300
290
280
270
260
250
240
230
220
210
200
190
180
0
0.05
0.1
0.15
0.2
0.25
0.3
Ground depth [m]

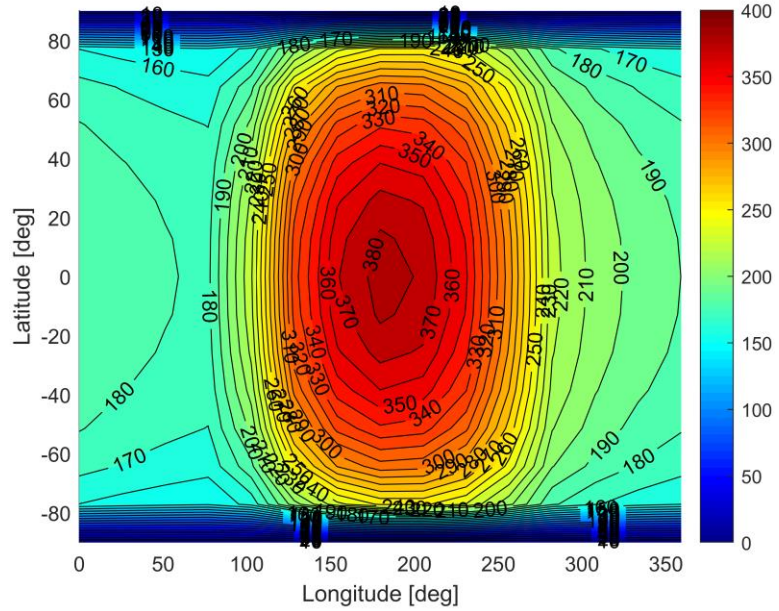
RESULTS

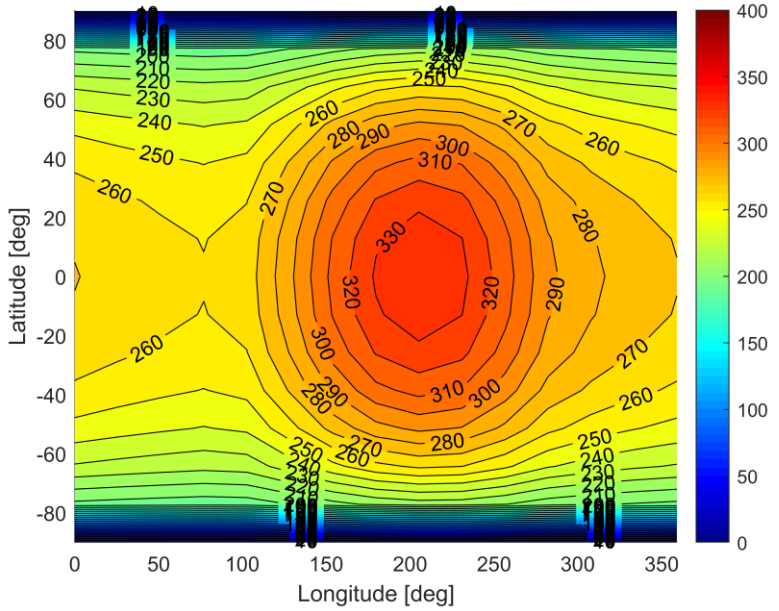

Temperature [K]
Longitude [deg]
360
340
320
300
280
260
240
220
200
180
160
0
50
100
150
200
250
300
350
1.074
1.074
1.574
1.574
2.073
2.073

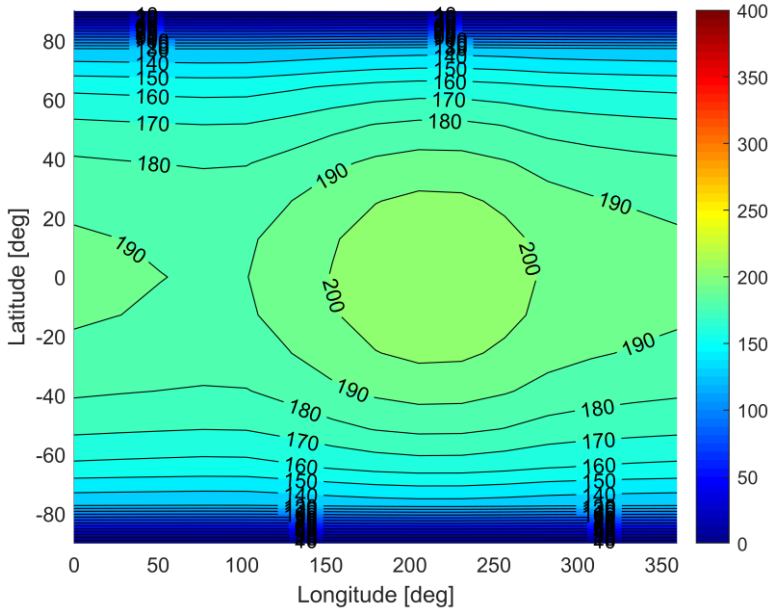
RESULTS

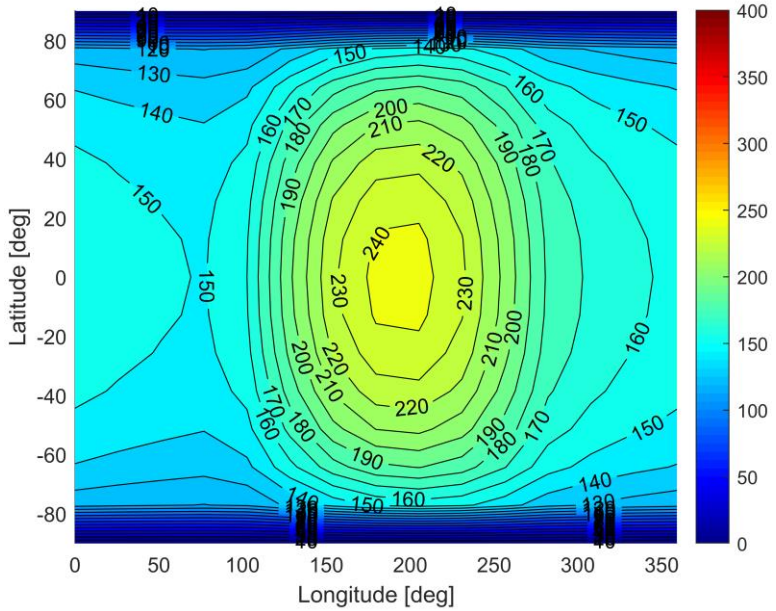

Temperature [K]
Time [h]
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
0
1
2
3
4
5
6
10000
10000
1000
1000
100
100
10
10

RESULTS

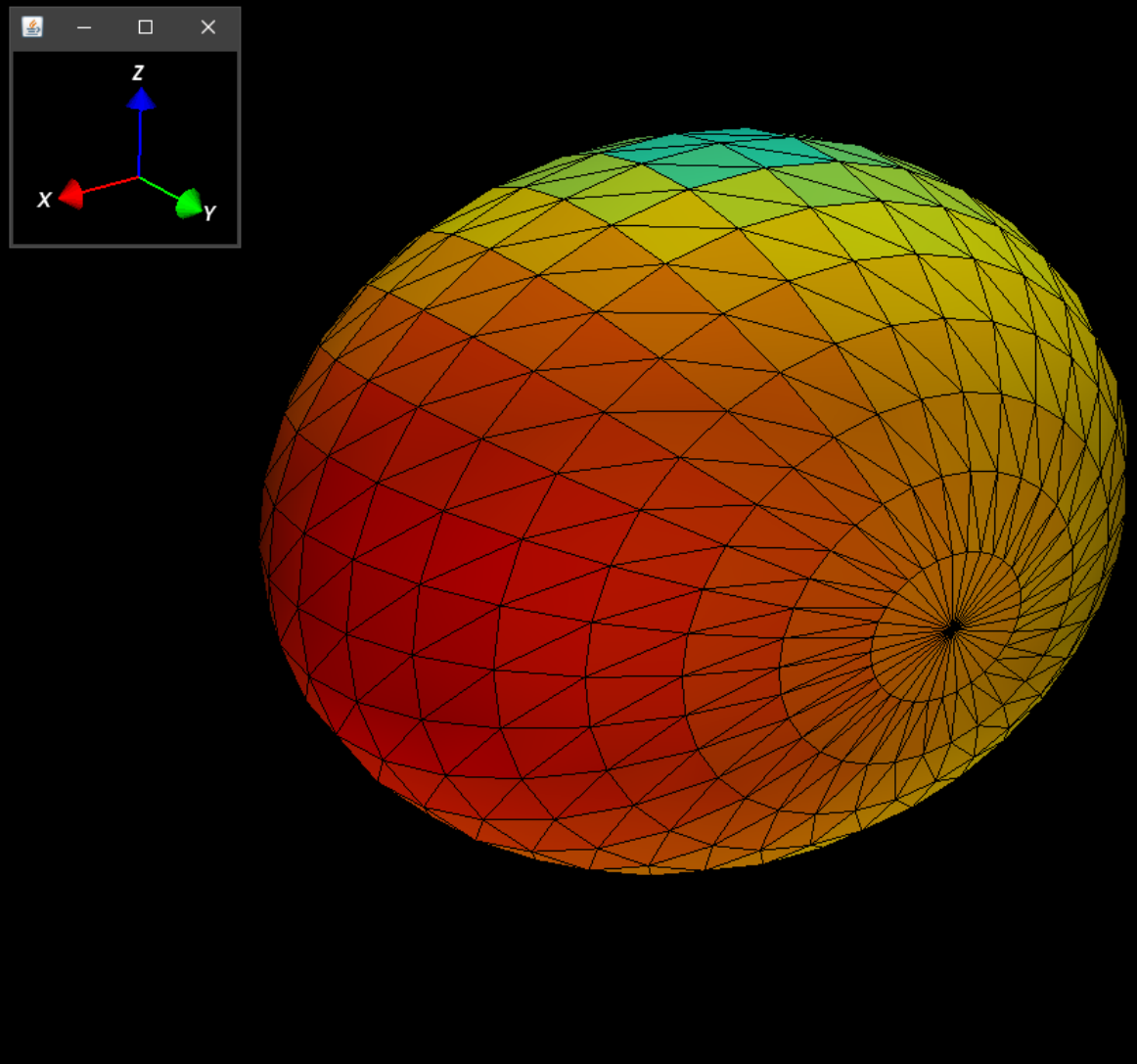

Latitude [deg]
Longitude [deg]


Latitude [deg]
Longitude [deg]

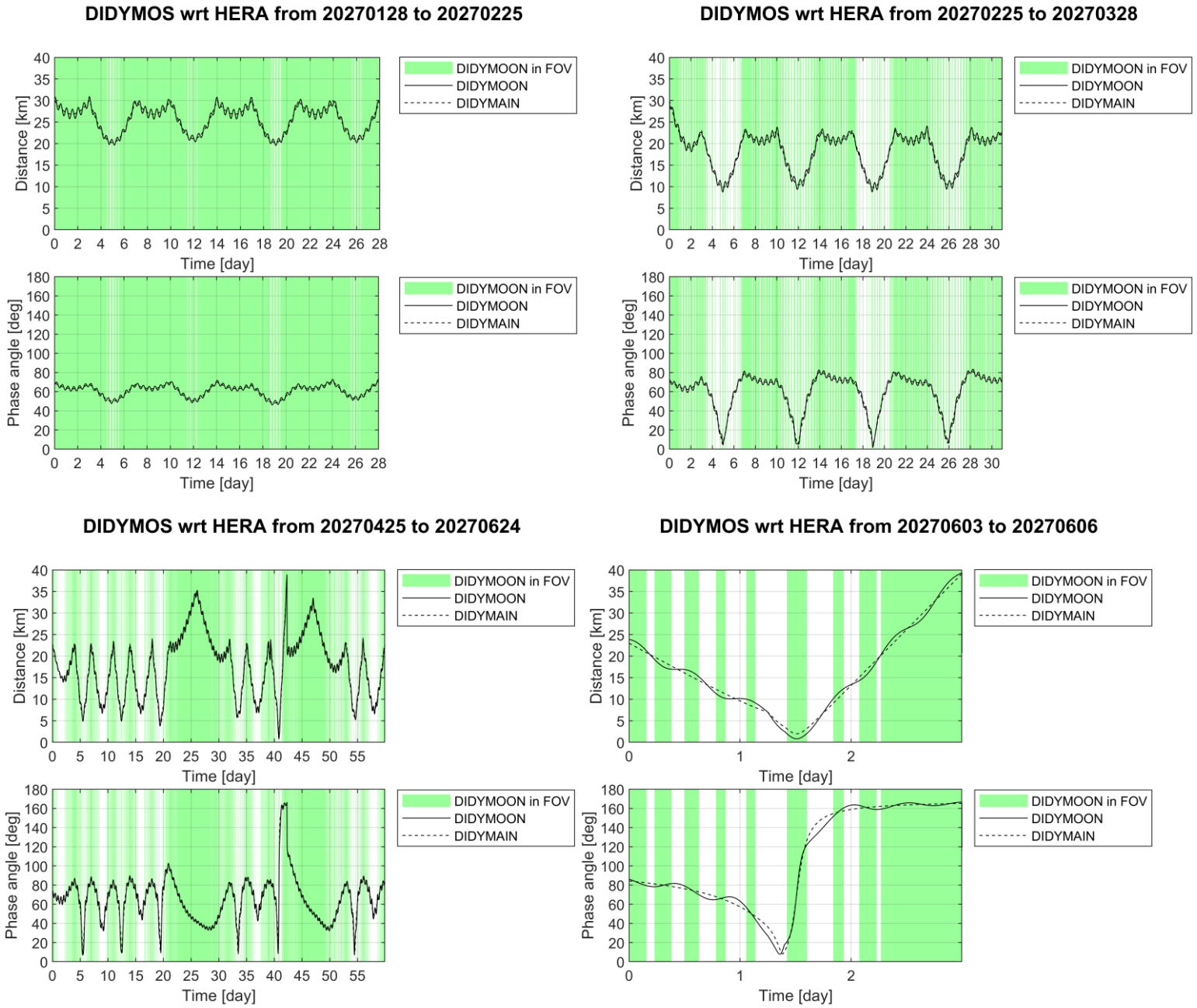

Latitude [deg]
Longitude [deg]


Latitude [deg]
Longitude [deg]

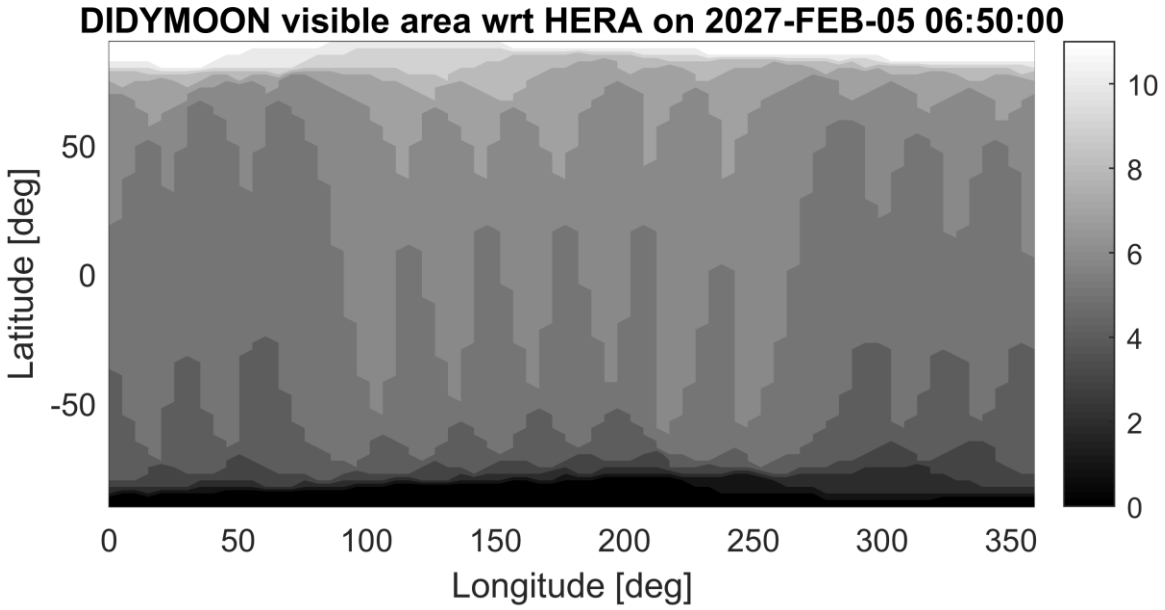
RESULTS

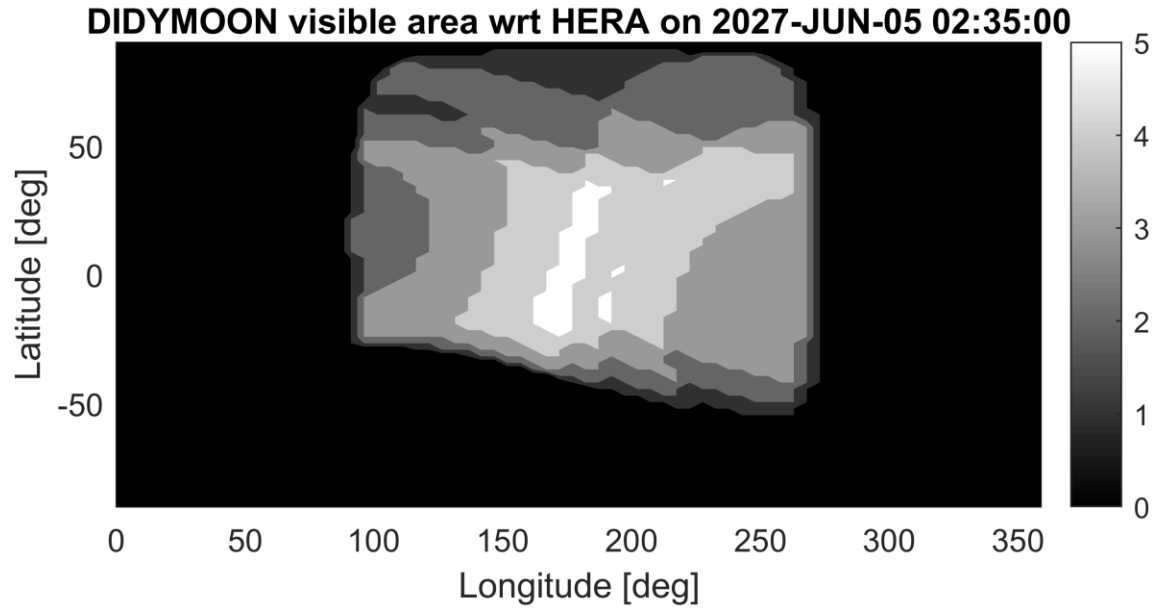


RESULTS


DIDYMOS wrt HERA from 20270128 to 20270225
DIDYMOS wrt HERA from 20270225 to 20270328
DIDYMOS wrt HERA from 20270425 to 20270624
DIDYMOS wrt HERA from 20270603 to 20270606
Distance [km]
Phase angle [deg]
Time [day]
DIDYMOON in FOV
DIDYMOON
DIDYMAIN

RESULTS


DIDYMOON visible area wrt HERA on 2027-FEB-05 06:50:00
Latitude [deg]
50
0
-50
0
50
100
150
200
250
300
350
Longitude [deg]
10
8
6
4
2
0


DIDYMOON visible area wrt HERA on 2027-JUN-05 02:35:00
Latitude [deg]
50
0
-50
0
50
100
150
200
250
300
350
Longitude [deg]
5
4
3
2
1
0