

Graphic representation solution in Excel is shown in Figure 4.1. Not all received six units of spreadsheet functions are stable. For persistent dependency should be reduced step calculation (increase the number of nodes). Graphical view results based on $n = 6000$ nodes shown in Figure 4.2.

Fig. 4.1. The change in temperature over time for 6 units

The calculation results: T1 - sustainable solutions, T2 and T3 - unstable solutions.

Fig. 4.2. The change in temperature in time to 6000 units

If $n = 6000$ made too many computing action impossible without the help of computers.

In this case, as shown in Figure 4.2, all dependences are stable.

Questions for self-control

1. Explain what order accuracy.
2. Explain the number of initial values that require Euler method to start the computation.
3. Explain that this convergence.
4. Write recurrent formula Euler method.
5. Explain how to avoid instability solution.

Tasks for independent work

Make a mathematical model to determine the object temperature T based on time t and obtain its solution, if known: K - heat transfer coefficient (three values); T_0 - initial temperature of the object; $T_{cp}(t)$ - the variation of ambient temperature, τ_{max} - time monitoring. The tasks are shown in Table 4.1.

Table 4.1. Variations to task for independent work

№ $T_{cp}(t)$ τ_{max} T_0 K

1 $1.4 + 0.3 * t * t$ 22 36 0.24 / 0.48 / 0.72

28-2 $* t$ 2 10 40 0.25 / 0.38 / 0.8

3 $3.2 + 2.1 * t$ 14 28 0.1 / 0.3 / 0.66

Feb. 4 $+ 1.8 * t$ 12 38 0.22 / 0.4 / 0.78

5 $25-0.24 * t * t$ 10 41 0.12 / 0.33 / 0.77

6 $26.2-0.31 * t * t$ 9 32 0.2 / 0.44 / 0.8

July 2nd $+ 0.18 * t * t$ 10 35 0.12 / 0.24 / 0.75

8 $1.87 + 0.21 * t * t$ 9 38 0.16 / 0.45 / 0.81

9 $30.22-0.031 * t * t * t$ 9.2 44 0.11 / 0.54 / 0.76

10 $3.21 + 0.015 * t * t * t$ 8.3 39.9 0.12 / 0.34 / 0.87