

The theme of the project

A microcontroller-based driving system will be developed, which will perform the following functions:

- Heating the system to a set temperature T_{SET} in a time $t_{heating}$
- Maintenance of these temperatures for a period of time $t_{maintenance}$
- System cooling gradually over a period of time $t_{cooling}$

user interface

- The system will have a 16x2 LCD on which the menu will be displayed, and during the running will be displayed the set temperature, the current temperature and the time remaining from the current stage ($t_{heating}$, $t_{maintenance}$, $t_{cooling}$).
- The menu of the system will allow to change the following parameters: T_{SET} , $t_{heating}$, $t_{maintenance}$, t_{racing} , K_P , K_I , K_D
- Parameters will be saved on non-volatile memories. Restarting the system will not affect the saved parameters.
- Navigation through the menu of the equipment will be done through four buttons: "OK", "Cancel", "+", "-".
- Optionally, it is possible to create an interface on PC for the display of a single graph of the temperature.

Temperature regulation

- Temperature control will be provided by a PID type regulator
- The temperature sensor used will be one of type LM35 or equivalent.
- The execution element of the system that will ensure the heating of the sensor will be an incandescent bulb c.c. of power $\geq 5W$ that will be able to reach a temperature of at least $50^\circ C$
- A relay or transistor shall be used to control the microcontroller turning the supply of this bulb on/off.

Disturbances

- A random number generator (PRNG or TRNG) will be implemented
- The system will have a disruptive generator that will affect the temperature measuring circuit with random values using the previously implemented PRNG/TRNG module.
- Pressing the "OK" button while running a temperature control program will start the disturbance mode, then pressing it again will stop it.