

Dynamics and statics: experimental estimations of the model parameters

5.1 Thermal process

Given heating element with a power $P=10$ kW. If maximal voltage $U = 220$ V is used temperature of the heating element can reach $T = 310$ °C. Temperature of the environment is $T_e = 20$ °C.

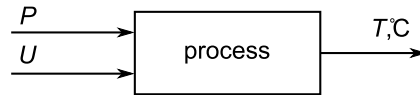


Figure 1: Thermal process

1. Provide static characteristics how temperature of the process T depends on voltage U_{rms} or power P (steady state).

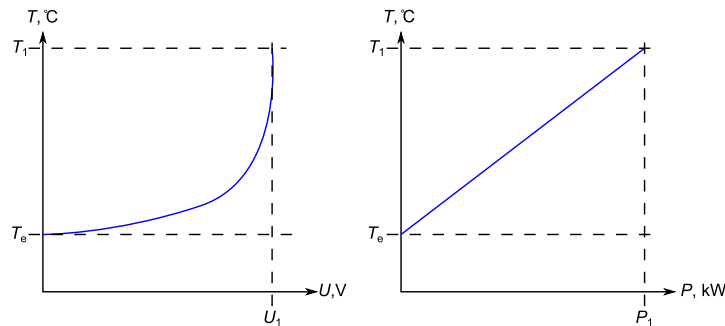


Figure 2: Steady-state

2. What voltage U should be provided in order to obtain temperature is $T = 200$ °C?
3. What will be the heating element temperature if power P is dropped up to 2 times from the previous case $P_3 = \frac{1}{2}P_2$?