

Lab. nr 37

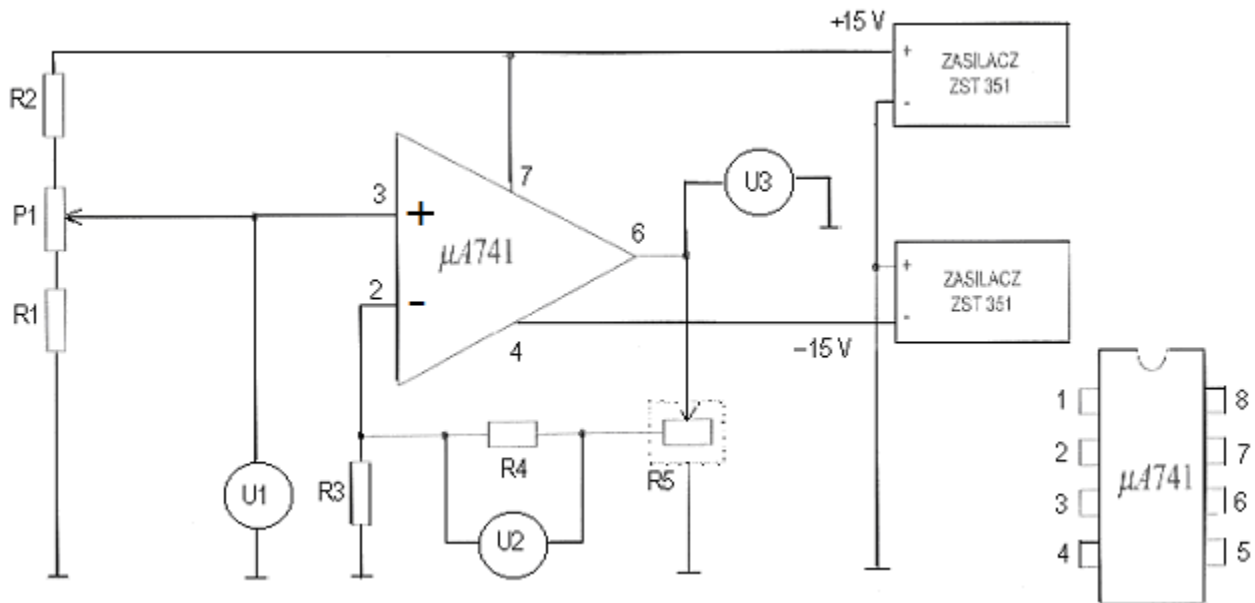
CURRENT SOURCE AND OP-AMP

Goals

The purpose of this lab is to gain familiarity with the operation amplifiers. An additional goal is to become acquainted with the operation of the current source.

1 Experiment

- 1.1 Build up the circuit shown below.



- 1.2 Investigate for what values of the resistance R_5 the current through R_5 , R_4 and R_3 resistors is stable and independent on R_5 . Repeat the investigation for two different values of voltage U_1 (one below 1V and one above 1V).
- 1.3 Repeat the above investigations after the reduction of the power supply voltages from +15V/-15V to about +10V/-10 V.
- 1.4 Draw the dependence of the output current I_{R_4} (equal to I_{R_5}) on the resistance of the load resistor R_5 : $I_{R_4} = I_{R_4}(R_5)$. Draw the U_3 voltage as a function of resistance of R_5 : $U_3 = U_3(R_5)$.
- 1.5 Explain the influence of U_1 on the stabilized current intensity and on the range of R_5 values covered with the constant current.
- 1.6 Explain the influence of the power supply voltages on the range for the load resistance changes not altering the output current intensity.

2. Background

Principles of the op-amp operation. Op-amp parameters. Op-amp applications. Feedback types. Current sources: definition and examples.

3 Literatura

[1] A. Rusek, *Podstawy elektroniki cz. 1*.

[2] D. Nührmann, *Elektronika łatwiejsza niż przypuszczasz – Układy scalone*.

[3] P. Horowitz, W. Hill, *Sztuka elektroniki*.

[4] Z. Nosal, J. Baranowski, *Układy elektroniczne. Cz. I. Układy analogowe liniowe*.