

See http://groups.yahoo.com/group/Electronics_101/message/12926
Post 12926

WAYS OF MAKING A POWER AMPLIFIER AND PUTTING THE POSSIBILITIES INTO PRACTICE.

A proper stepper motor driver generally depends in its work on a power amplifier and a current adapter. **Mine?** winding is characterized by three parameters: resistance, inductance and nominal current. Motor's winding can be described as serial inductance L_s and resistance R_s . The graph of current in this winding is defined with the following formula:

$$I = (U/R) / (1 - \exp(-t/T))$$

gdzie $T = L_s/R_s$

Time constant L_s / R_s **si** usually equals about 10 ms, **therefore after 3T time accomplish 95% establish value is equal 30 ms?** I must admit that it is a really big value. Power systems are designed to achieve higher speed increasing current and the frequency of motors' work.

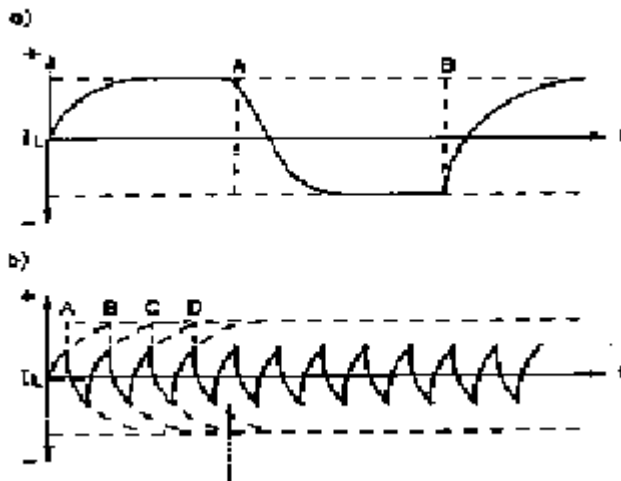
The graph presenting flow current in the main windings of motors:

Within the range of high rotational speed a classical control (by voltage) is completely sufficient. Then, the value of current strongly depends on the resistance of windings.

We can talk about three basic sources of power supply.

Wykres przepływu prądu w uzwojeniach silnika

- a) przy małych prędkościach obrotowych*
- b) przy dużych prędkościach obrotowych*

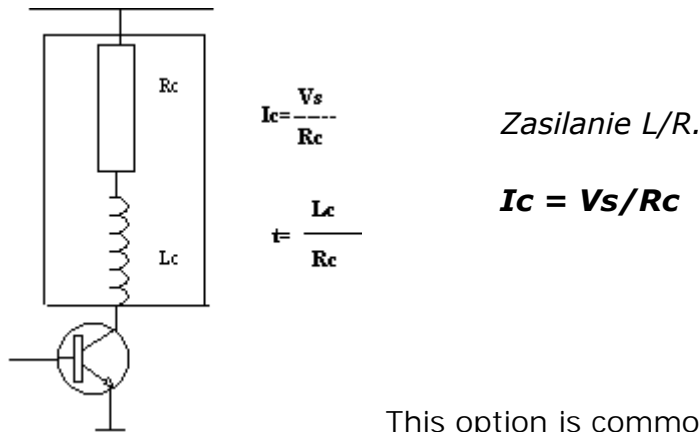


CONTROL L/R

Within this range a classical control is enough. The nominal current value results here from the resistance of windings.

This option is commonly called 'control L/R', because the value of current increases in windings in the strictly defined period of time.

Unfortunately, in one step that system isn't able to achieve the full nominal value **when that is quick rotate?**. The result of it is a lower torque.



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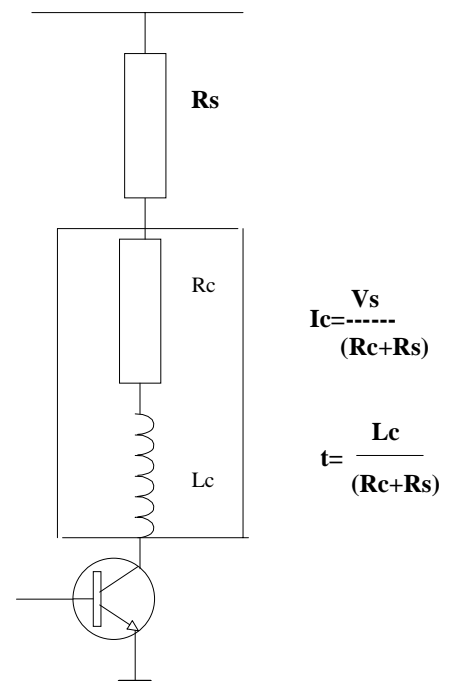
$T = L_c/R_c$

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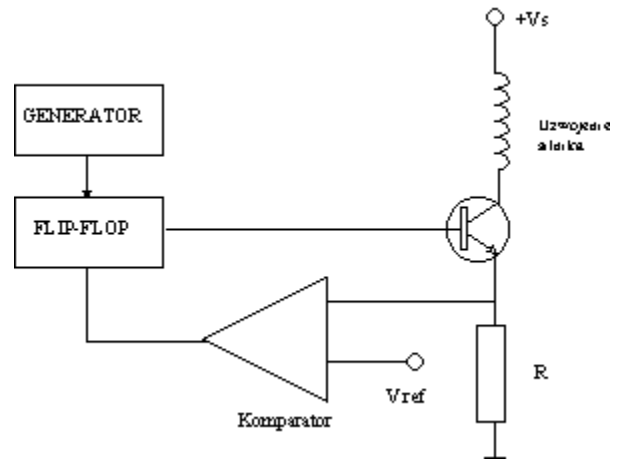
CONTROL L/nR

One of the simplest ways to increase voltage is to raise voltage and set it in additional serial resistors R_s . In this way we achieve a lower time value **in circumstances where is the current?** because this operation decreases the induction circuit (the inductance **is divided by sum resistance main and additional in circuit?**). We should calculate this resistance in order to obtain nominal current after change.

Time increases inversely proportionally to the resistor's value R_s . This option of control is frequently called 'control L/nR', but it is accompanied by great power waste and rather we don't use it in many applications.



Zasilanie L/nR .

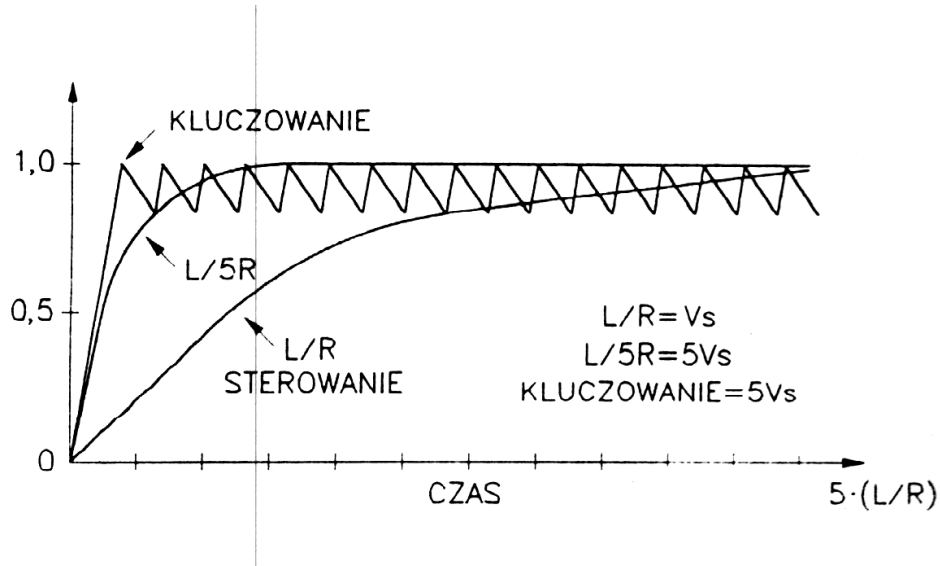


STEROWANIE Z KLUCZNIEM PRĄDU

CONTROL WITH A CURRENT-MODE LOGIC (CML)

This is another solution. It is the type of control with a current wave, there are no significant disadvantages like those appearing in the above-mentioned types of control. Additionally, we can achieve a really high rotational speed. This type of control really has high efficiency. One of its significant advantages is the possibility to regulate the **intensity of current depend of voltage?** The additional advantage is the possibility to control current in the circuit by changing incoming voltage to a comparator. The higher voltage, the higher intensity of current in the motor's circuit.

NOTE



Czas narastania prądu w uzwojeniu dla różnych rodzajów sterowania