Motor Armature Resistance

Name: Group 510
Date: 30/09 - 2015

Purpose

The superpose of the test is to measure the Armature resistance R_a.

Setup

Input a diagram of the test setup:

List of Equipment

Example of list of equipment:

Instrument	**AAU-no.**	**Type**
Multimeter 1	60764	Fluke 189 True RMS
Multimeter 2	60769	Fluke 189 True RMS
Power Supply (0 - 32 V) (0 - 10 A)	77076	Ea - ps 7032 - 100
Clamp for fixing the motor	03039	

Procedure

1. Turn on the two multimeters and choose Voltage and Ampere setting respectively.
2. Fix the motor shaft so it does not turn.
3. Choose the first current value (0.5 A) on the current limiting of the power supply.
4. Turn on the power supply and adjust the current limiting in accordance with the ampere meter.
5. Repeat the two previous steps for each measurement of 0.5 A increments up to 5 A.
6. Switch the poles of the power supply and repeat the measurements in the negative direction.

Results

Input (A)	Output (V)
−5.0	−0.07
−4.5	−0.14
−4.0	−0.20
−3.5	−0.27
−3.0	−0.36
−2.5	−0.43
−2.0	−0.54
−1.5	−0.59
−1.0	−0.65
−0.5	−0.71

Input (A)	Output (V)
0.5	0.16
1.0	0.34
1.5	0.53
2.0	0.62
2.5	0.64
3.0	0.75
3.5	0.78
4.0	0.80
4.5	0.83
5.0	0.88

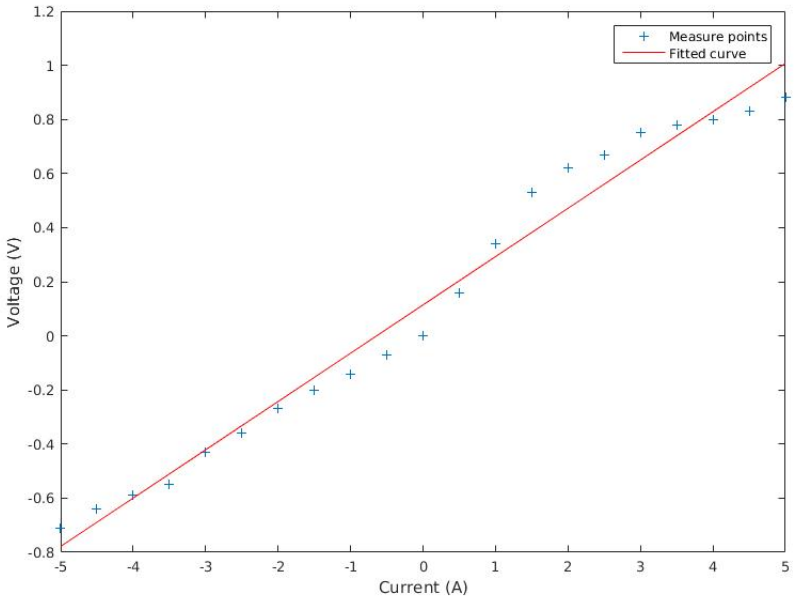

Figure 0.1: Plot of test results

The slope of the fitted curve yields: $R_a = 0.17\Omega$

Motor Armature Inductance

Name: Group 510
Date: 30/09 - 2015

Purpose

The superpose of the test is to measure the Armature inductance L_a.

Setup

Input a diagram of the test setup:

List of Equipment

Instrument	**AAU-no.**	**Type**
Power Supply $(0-32$ V$)$ $(0-10$ A$)$	77076	Ea - ps 7032 - 100
AC/DC Current Clamp (Output: 100 mV/A)	78550	FLUKE i30s
Oscilloscope	64672	Agilent DSO6034A
Clamp for fixing the motor	03039	

Procedure

1. Fix the motor shaft so it does not turn.
2. Start with the power supply disconnected and turn on the oscilloscope.
3. On the oscilloscope press the "mode"-key choose the "normal"-option and push the "single"-key.
4. To prevent false triggering on the oscilloscope set the trigger value to [1] mV with the turn-key.
5. To give the motor a pulse of 5 V, put the power supply to 5 V and connect it.
6. Insert a USB-pin in the oscilloscope and press the save key to extract the data.

Results

Insert graph[2]

[1] FiXme Note: input value from extracted data
[2] FiXme Note: Insert graph

Tachometer Constant

Name: Group 510
Date: 30/09 - 2015

Purpose

The superpose of the test is to measure verify that tachometer constant (in V) is 0.030 multiplied by the motor constant.

Setup

Setup

List of Equipment

Instrument	**AAU-no.**	**Type**
Power Supply $(0-32$ V$)$ $(0-10$ A$)$	77076	Ea - ps 7032 - 100
Multimeter	60764	Fluke 189 True RMS
Tachometer motor measurement stand	08772	
Optical tachometer	08246	Shimpo DT-205

Procedure

1. Adjust voltage of power supply till you reach 6 V on the multimeter over the tachometer.
2. Measure the RPM with the Optical tachometer.

Results

Measured: 1933 RPM We use the measured RPM to verity a tachometer constant of 0.03:

$$\frac{1933}{60} \cdot 2 \cdot \pi \cdot 0.03 = 6.07 \approx 6 \quad \text{[V]} \quad (1)$$

Generator Constant

Name: Group 510
Date: 30/09 - 2015

Purpose

The purpose of the test is to find the generator constant K_e by measuring the motor voltages, currents and velocities, in several steady states.

Setup

Setup

List of Equipment

Instrument	**AAU-no.**	**Type**
Multimeter 1	60764	Fluke 189 True RMS
Multimeter 2	60769	Fluke 189 True RMS
Power Supply $(0-32$ V$)$ $(0-10$ A$)$	77076	Ea - ps 7032 - 100
Optical tachometer	08246	Shimpo DT-205

Procedure

1. Turn on the two multimeters and put them in ampere and voltage mode respectively.
2. Apply 1 V by use of the voltage mode multimeter
3. Read out the current value from the ampere mode multimeter
4. Read out RPM of the motor using the optical tachometer.
5. Repeat the past 3 steps up to 7 V in 1 V increments.

Results

Input (V)	**Output (A)**	**Output (RPM)**
1	1.7	3684
2	2.2	8063
3	2.6	12021
4	3.3	16746
5	4.1	21966
6	4.8	26420
7	5.6	31447