Exercise Report

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| --- | --- |
| **Subject of this exercise:** | “Two-terminal electronic components” (Measurement 6) |
| **Date** | <DD><MM><YYYY> |
| **Number of measurement place** | <Number on the table> |
| **Students:** | <Name of Student 1>  <Name of Student 2> |
| **Course/code:** | <course>, <group> |
| **Lecturer** | <Name of lecturer> |

Equipment in use, devices under test

|  |  |  |
| --- | --- | --- |
| Digital multimeter (6½ digit) | Agilent 33401A | MY4< > |
| Impedance analyzer | Wayne-Kerr 6440 | Unit No.: < > |
| Test board | VIK-I-06-01 |  |
| Test board | VIK-I-06-02 |  |

Exercises

1. Small resistance measurement

1.1. Measure the resistance of a 1-meter long cable with a high-precision multimeter using 2- and 4-wire methods as well, and then without using additional wires, i.e., connecting the cable into the multimeter directly. Repeat the measurement with the Wayne-Kerr impedance analyzer.

<Measurement experience>

1.2. Make a coil from the cable being measured, first using standard winding, then bifilar winding. Plot the impedance characteristics for the standard and the bifilar wound coils, compare the results, and point out the differences.

<Measurement experience>

2. Resistance as a function of power

2.1 Measure the non-ideal characteristics of a resistor, i. e., the dependence of its resistance on the temperature. Do not forget to check the voltage on the terminals. *Be careful: the resistor may become hot!*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| U [V] | 1 | 2 | 3 | 4 | 5 |
| R [Ω] |  |  |  |  |  |
| P [mW] |  |  |  |  |  |

<Measurement experience>

3. Inductance measurements

3.1 Compare the impedance characteristics of an air core inductor with those of a similarly wound ferromagnetic core inductor. Explain the characteristical differences in details.

<Measurement experience>

3.2 Measure the inductance of an air core inductor as a function of frequency, if a series R-L model is applied.

<Measurement experience>

4. Resonance of a parallel LC circuit

4.1. Design a measurement setup to observe the resonance phenomenon and to measure the resonance frequency of a parallel LC circuit by *not* using the Wayne-Kerr impedance analyzer.

<Measurement experience>

4.2. Measure the resonance parameters by using the Wayne-Kerr impedance analyzer. Plot the impedance characteristics.

<Measurement experience>

4.3. Plot the Z(f) characteristics.

<Measurement experience>

Extra exercise

5. Analyzing an unknown two terminal circuit

The aim of the measurement is to practice the modeling with the help of the analysis of an unknown two terminal circuit.

5.1. Analyze the impedance of the two- or three-component circuit chosen by your instructor. Determine the components of this particular circuit as well as their actual parameters.

<Measurement experience>