Kirchhoff's voltage law lab report

Experiment 5 Laws ~ KirchHoffÃ ¢ s Objective: Check laws KirchHoffÃ ¢ S comparing tensions obtained from a real circuit for those provided by the KirchHoffÃ ¢ s laws. Introduction: A simple circuit is one that can be reduced to an equivalent circuit containing a single resistance and a source of single voltage. Many circuits are not simple and require the use of KirchHoffÃ ¢ s laws to determine the voltage, current or resistance values. KirchHoffÃ ¢ s laws for current and tension are given by equations 1 and 2. In this experience, we will build two circuits with 4 resistencies and a fountain of tension. These circuits will not be simple, so KirchoffÃ ¢ s laws will be necessary to determine the current in each resistor. We will then use a digital multimeter to get an experimental value for the voltage in each resistance in the circuits. KirchHoffÃ ¢ S laws will then be applied to the circuits to obtain theorical values for the current in each resistor. Through the Application of Law Ohma S, then we can get a teemic value for the tension in each resistor. The experimental and technical tensions can then be compared by error%. Device: Proto-board 4: Resistencies (R1 = 68KÃž Â ©, R2 = 47KÃ Â ©, R3 = 15KÃ Â ©, R4 = 1000kÃž Â ©) Digital Multimeter Feeding Variavable Conductor Wires of crocodile clips Experimental procedure Part 1: 1. Using the proto-maple, resistencies 4, the source of variable power, and wire and crocodile connections clips; Build the circuit shown in Figure 2. 2. Connect the power supply. Connect the multi-metro between the feed source and regulate the tension to 8.0 volts. 3. Connect the multermometer between each resistencies 4. Record these 4 voltage values in the data table. 4. Connect the feed source and turn off the circuit. + V The R 3 RRR 4 2 1 Figure 1 Experimental Procedure Part 2: 1. Add a second feed source for the circuit as shown in Figure 3. + + v 0 R - 3 rrv 1 4 2 1 2 Figure 2. Connect the fonts of power. Adjust the V0 and V1 volt tensions to 4.0 volts. 3. Connect the multermometer between each resistencies 4. Record these 4 voltage values in the data table. 4. Connect the feed source and turn off the circuit. Analysis: 1. For the first circuit, use equations 1 and 2 to write a system of linear equations that can be solved for the current in each branch of the circuit. Then resolve the system to get a teemic value for each course. Show your work! 2. Using the currents obtained in step 1 of the analysis; Apply the Ohma S Law to determine the tension tension in each resistor. 3. Compare the technical tensions obtained in step 2 of the analysis to the measured in the actual circuit. 4. Repeat steps 1 through 3 for the second circuit. 5. Record the technical tensions, experimental tensions, and errors% in the results table. Results: part # 1 v (teoric) v (experimental)% error part # 2 v (teoric) v (experimental)% error r1 = r2 = r3 = r4 = r1 = r2 = r3 = r4 = challenge: repeat experimental Steps 1 -4 And The Analysis For The Circuit In Figure 4 With 5 Resistencies And A Feed Source: (R1 = 68KÃž Â ©, R2 = 47KÃž Â ©, R3 = 22KÃ Â ©, R4 = 15KÃ Â ©, r5 = 1000kÃž Â ©) Results Figure 4 Challenge: Test # 1 R1 = R2 = R3 = R4 = R5 = V (Teorico) V (Experimental)% Error Lab Report 4 Eléc Analysis circuit - a table of contents Suma .... 2 device .... 2 Objective .... 2 theory .... 2 Lei KirchhoffÃ¢ s s 2 Procedure .... 3 (a) validation of the Law of Tensan KirchHoffÃ ¢ Voltage rule divisor .... 3 readings .... 4 simulated in proteus .... 4 Verification and comparison Result of result .... 6 b) Validation of current law KirchHoffÃ ¢ Current divider rule .... 7 Readings .... 7 Simulated in proteus .... 8 verification and comparison of result .... 9 questions .... 10 chronic analysis .... 11 Pan Gina 1 of 11 Lab Report 4 Abstract: Five resistors of different resistors were used to call the series and parallel circuits in the bead of the bread respectively. In the circuit voltage in each resistor were found by multermomer as a voltometer after the 5V voltage application. Theoretically each voltage value was calculated by the divider rule voltage. Likewise, the parallel circuit was designed and the current at each resistor was measured by amperimeter and calculated by the current rule divisor, hence kirchhoffÃ ¢ s both rules verified by comparison. Appliance: i i i i i i i i i 1 multimeter digital resistors Connect the Breadboard Cables DC Power Supply Objective: Study the validity of tension and current laws kirchhoffÃ ¢ s. I to study the validity of the current voltage and principles division. Theory: KirchHoffÃ ¢ s Laws a. KirchHoffÃ ¢ s Law KirchHoffÃ ¢ s Law states of tension that the alternative sum of potential drops throughout the full path is equal to zero. It is based on the energy conservation. Means sum of the voltage falls is equal to the sum of increased tension. From the figure, vab + vbc + vdd + vda = 0 tension on a closed path 2 of 11 label lab 4 b. KirchHoffÃ ¢ s Current Law KirchoffÃ ¢ s States Current Law that the node's entry current is equal to the current leaving the n³. It is based on cargo conservation. It means alternative sum of chains that enter a node is zero. From the figure, -i1 + i2 + i3 Ã ¢ i4 = 0 enter with the current & leaving a procedure unique of the law KirchHoffÃ ¢ s tensile and tension rule divider 1. used five value resistors 100i-©, 848 Â ©, 504He ©, 179 Â © and Â © â € 1500 â € s to draw given circuit on SÃ © Rie in Taba. 2. 5.21V applied from the DC and DMM feed source used to measure the total tension exit of resistors and falling potential in each of the five resistors. The table registration values. Using Next Relation, Law Tension KirchHoffÃ ¢ s is verified: 3. 4. V5555555555555555555555555. Potential drop in each resistor than calculated by Voltage Divider rule. When calculating potential sum falls in each validate resistor Lei Voltage the KirchHoffÃ ¢ s. Page 3 of 11 laboratory report 4 readings: tension element through element (V) calculated measured measured R1 (ã, |) 100 A | V1 0.166V 0.16V 0.17V R2 (A |) 848 A | V2 1.411V 1.39 V R3 1.41V (ã, |) 504 A | V3 0.839V 0.82V 0.84V R4 (A |) 179 A | V4 0.298V 0.29V 0.30V R5 (ã, |) 1500 A | V5 2.496V 2.48V 2.50V Under Proteus: Tension in the 100 | Resistance Tension in the 179 | Resistor página 4 of Lab Report Voltage £ 4 in the 504A | Voltage endurance in the £ ¢ 848Ã | Resistor page 5 of 11 4 Voltage lab Report on the 1500 £ | Checking and the resistor £ £ ComparaÃ§Ã of the results: R1 = 100 ¢ | R2 = 848 ¢ | R3 = 504 | R 4 = 179 ¢ | R5 = 1500 | teÃ³rico Total Total Total Value measured actual value the value £ voltage (V) Voltage (V) Voltage (V) to 5.21V 5.14V 5.21V £ descriÃ§Ã the above table shows £ comparaÃ§Ã of the calculated values, The actual and measured values. The voltage drop across each resistor £ the theoretically calculated £ voltage divider rule and the sum of which equals the voltage applied © or real. © The value measured at 5.14V 5.21V less than the voltage applied to the © £ due to the energy lost during the mediÃ§Ã £ © s atravÃ of resistances. Thus, to verify the voltage £ ¢ s Rule KirchhoffÃ use the following equaÃ§Ã the £: V1 + V2 + V3 + V4 + V5 = V + 0.16V 1.39V + 0.82V + 0.29V + 2.48V = 5.21V 5:14 v ¢ 5.21V page 6 of 11 RelatÃ³rio Lab Procedure 4: ValidaÃ§Ã the current £ ¢ KirchhoffÃ Law if Rule 1. Used current Divider Five value resistors 1500A © Ã, Â © 848Ã 504a and Â © drawing data tÃ¡bua parallel circuit of bread in the £. 2. 5.21V applied from the voltage £ £ Power Supply and DC DMM used to measure the total current throughout the circuit and current atravÃ © s of each of the three resistors. The table registration values. Using the following £ Interface, Voltage Law £ ¢ S to the KirchhoffÃ © Found: 3. 4. i a i Â ½ I1 'I2 AA' atravÃ current I3 5. © s calculated that each resistor Divider by the current rule as excavation m © current across the circuit calculated by finding equivalent Resistance of three resistances and the applied voltage £. Readings: © s current atravÃ element (mA) Calculated Measured Simulated I (s atravÃ © £ the supply voltage) 19.96mA 19.9mA 20.0mA element R1 (a |) 1500 A | R2 3.47mA 3.53mA 3.5mA I1 (A |) 848 | R3 6.14mA 5.93mA 6.2mA I2 (Ã ¢ |) ¢ 504 | I3 10.50mA 10.2mA 10.3mA page 7 4 11 Lab RelatÃ³rio simulated in Proteus: Current atravÃ © © Â s current resistor 504a atravÃ © Â © s 848Ã resistor page 8 4 11 Lab Report current atravÃ © s 1500A resistor total current atravÃ © © s Checking circuit comparaÃ§Ã £ £ o the result of: Req = Total = Resistance to 2852 | R 1 = 1.500 A | R2 = 848 ¢ | R3 = 504 ¢ | Total Amount teÃ³rico value measured actual total current value (mA) Current (mA) Current (mA) 19.96mA 19.9mA to 20mA page 9 Lab Report 4 11 The above table shows the values £ comparaÃ§Ã calculated and actual measured current. Current atravÃ © s theoretically calculated for each resistor divider chain rule and whose sum equals voltage applied © or real. The value measured at less than © 19.9mA to 20mA current applied to the © insignificant as the unit of measure © mA and it could be because of mediÃ§Ã instrument error and the £. So, to check the KirchhoffÃ ¢ s current rule, we use the following equaÃ§Ã £ o: I1 + I2 + I3 = 3.5 mA + I + 6.2mA 19.9mA 19.9mA one sÃ © series of questions 20.0mA 10.2mA = 1. what Ã © path / cycle? How many roads / loop exist in the following figure? Answer: Path / Loop: A Ã © laÃ§o any closed path in a circuit. A loop typically determines the current flow in a closed circuit. Thus, in the above figure, there are three loops. The laÃ§o 2 laÃ§o one loop page 3 10 4 11 Lab Report 2. Two resistances R1 and R2 is connected the Sa £ © Series. The voltage drop of the atravÃ £ © © s R1 is greater than R2. What can we infer about comparative values of resistances? R 1> R 2 or R1R2. Analyzing cratic / ConclusÃ £ o: Two task were performed to validate the Law KirchhoffÃ ¢ s. In the first task, given circuit in sÃ © rie including different resistances were construÃdas in tÃ¡bua. The voltage applied by the £ DC Power Supply and after the voltage across each resistor £ were found. The measured value found by using multÃmetro as a voltmeter is ascertained by law Voltage £ the first KirchhoffÃ ¢ is then compared to the actual and calculated value (found using Voltage £ the divider Rule) which was almost equal, validates the KirchhoffÃ ¢ s Voltage law £ o. in the next file We use Breadboard again to build a given parallel circuit with three resistors. As the tension remains the same but current divides through the parallel parallel We found the current by multermometer after applying tension for circuit. From what theoretically we calculate the values of the current through each resistors and compared the values with the measured values and then the measured values were compared with the actual value proving the current Kirchhoff law. Thus, in the end, both the task was validated and the law of Kirchhoff was proven and found about the current and tension divider rule, which happens because of the current and tension behaviors through SÃ © rie and parallel circuits. Página 11 of 11 11 11