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1 | Figure Sample

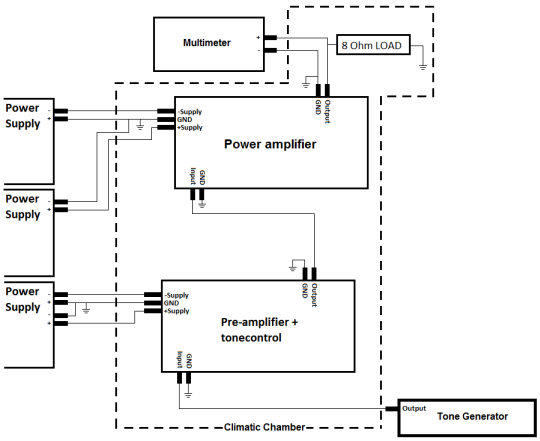

Figure 1.1: This image is clearly too small, remember to scale appropriately[1]

Figure 1.1 ← this is used in the beginning of a sentence, whereas *figure 1.2* is used in the middle of a sentence[2].

This reference only represents this line since it is before the punctuation mark[1]. This next reference however represents the entire section. That is, all of the preceding sentences in the entire section. This is due to the fact that it is now after the punctuation mark in the end of the section (this is not used in the middle of a section!).[1]

Here is a ~~good~~ messy way to make two images appear on the side of each other. Also, if you modified an image, this is how you properly refer to its original source:

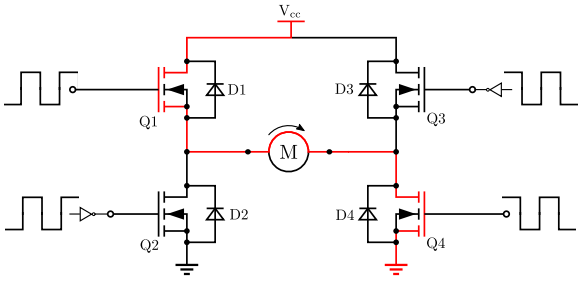

Figure 1.2: Clockwise 4Q operation.
Edited from image by Biezl.[2]

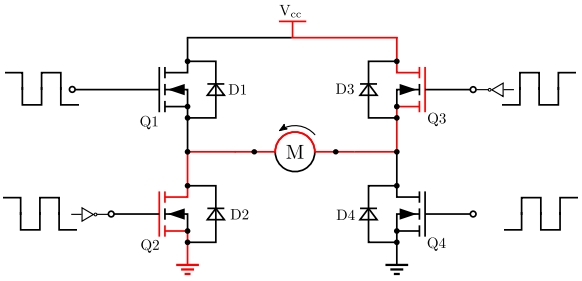

Figure 1.3: Counterclockwise 4Q operation.
Edited from image by Biezl.[2]

[2] FiXme Note: This however does work in the footnote

1.1 Table Sample

No.	Description	Min	Max	Requirements
1	Some Text	Some Text	Some Text	Some Text Some More Text Text Text Text Text Text
2	Some Text	Some Text	Some Text	Some Text
3	By specifying the width of a column (|p{5cm}|) the cells in that column will not exceed the specified width but instead expand downward.	Some Text	Some Text	Some Text
4	Some Text	Some Text	Some Text	Some Text
Some Text		Some Text		
Text Text		Text = Text Text = Text Text = Text Text = Text Text = Text		
Some Text		Teeeexxtt LaTeX		

Table 1.1: This Is a Table

Table 1.1 ← this is used in the beginning of a sentence, whereas *table 1.1* is used in the middle of a sentence.

1.2 Equation Sample

A normal equation:

$$\mathrm{J_m} \cdot \dot{\omega}_\mathrm{m}(\mathrm{t}) = \tau_\mathrm{m}(\mathrm{t}) - \mathrm{B_m} \cdot \omega_\mathrm{m}(\mathrm{t}) - \mathrm{r_m} \cdot \mathrm{f_c}(\mathrm{t}) \quad [\mathrm{N \cdot m}] \quad (1.1)$$

Where:

J_m	is the motor's inertia	$[\mathrm{kg \cdot m^2}]$
$\omega_m(t)$	is the angular velocity of the motor	$[\mathrm{rad \cdot s^{-1}}]$
$\dot{\omega}_m(t)$	is the angular acceleration of the motor	$[\mathrm{rad \cdot s^{-2}}]$
$\tau_m(t)$	is the torque delivered by the motor	$[\mathrm{N \cdot m}]$
B_m	is the motor's friction coefficient	$[\mathrm{N \cdot m \cdot s \cdot rad^{-1}}]$
r_m	is the radius of the gear, G_m	[m]
$f_c(t)$	is the contact force between the two gears	[N]

If you need to write some expression without an equal sign:

$$\frac{\mathrm{r_m} \cdot \mathrm{r_t}}{\mathrm{r_d}} \cdot \mathrm{M} + \frac{\mathrm{r_d}}{2 \cdot \pi \cdot \mathrm{r_m} \cdot \mathrm{r_t}} \cdot \mathrm{J_m} + \frac{\mathrm{r_m}}{2 \cdot \pi \cdot \mathrm{r_t} \cdot \mathrm{r_d}} \cdot \mathrm{J_d} \quad (1.2)$$

Expression (1.2) is referencing to *expression (1.2)*, but in the beginning of a sentence.

If you need to write something with numbers:

$$\mathrm{B} = 2{,}2 \cdot 10^{-6}\ \mathrm{N \cdot m \cdot rad^{-1} \cdot s} \quad (1.3)$$

$$\tau_\mathrm{c} = 0{,}0016\ \mathrm{N \cdot m} \quad (1.4)$$

To reference several equations in a sentence:
equation (1.1) and *(1.3)*
equation (1.1), *(1.3)* and *(1.4)*

To reference several equations in the beginning of a sentence:
Equation (1.1) and *(1.3)*
Equation (1.1), *(1.3)* and *(1.4)*

This works for up to 7 equations.

2 | Chapter 2

Here is the header, usually it is written or at least reviewed after the chapter (or large section) is done, this gives the best result.
Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet odio. Integer vitae justo. Aliquam vestibulum fringilla lorem. Sed neque lectus, consectetuer at, consectetuer sed, eleifend ac, lectus. Nulla facilisi. Pellentesque eget lectus. Proin eu metus. Sed porttitor. In hac habitasse platea dictumst. Suspendisse eu lectus. Ut mi mi, lacinia sit amet, placerat et, mollis vitae, dui. Sed ante tellus, tristique ut, iaculis eu, malesuada ac, dui. Mauris nibh leo, facilisis non, adipiscing quis, ultrices a, dui.

2.1 Section 2.1

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TIP: Ctrl+LeftClick in the compiled pdf will let you jump to that particular point in the code. It also works from the code to the pdf.

Subsection 2.1.1

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetuer.

Subsubsection 2.1.1.1

As mentioned, do not use a subsubsection without a chapter section and subsection above it - do also avoid using `\textbf{}` for headlines.

3 | Test

Name: Group 630
Date: 21/02 - 2016

Purpose

The purpose of the test.

Setup

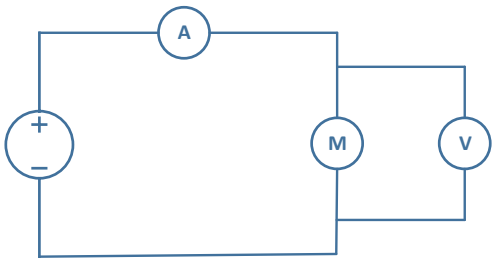

Figure 3.1: Setup diagram

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 settings respectively.
2. Fix the motor shaft so it can not turn.
3. Choose the first current value (0,0 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. Read the voltage supplied to the motor from the volt meter.

6. Repeat the three previous steps for each measurement in 0,5 A increments up to 5 A.

7. Switch the poles of the power supply and repeat the measurements in the negative direction.

Results

Input (A)	Output (V)
−5,0	−0,71
−4,5	−0,65
−4,0	−0,59
−3,5	−0,54
−3,0	−0,43
−2,5	−0,36
−2,0	−0,27
−1,5	−0,20
−1,0	−0,14
−0,5	−0,07

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

There are sometimes discussions about where to put the following. Sometimes it makes more sense to have it in the section where the test is used. Whichever way is chosen, should be consistent throughout the report.

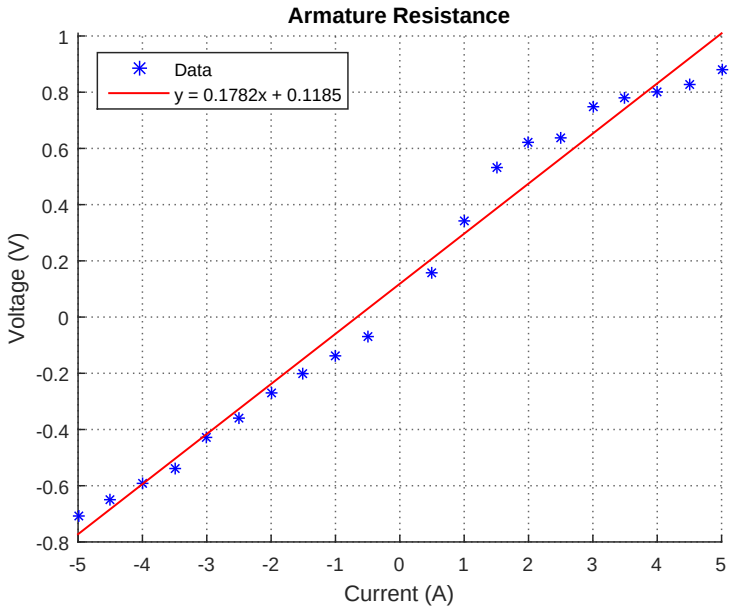

Figure 3.2: A plot of a measured armature resistance, with a red line indicating the average value.

During these measurements the motor is in steady state. This is necessary for the inductor in the armature coil to act as a short circuit, which ease the calculation of the armature resistance. In steady state we get:

$$R_a = \frac{U_a}{I_a} \quad [\Omega] \quad (3.1)$$

Where:

I_a	is the armature current	[A]
U_a	is the armature voltage	[V]
R_a	is the armature resistance	[Ω]

As seen on the data plot in *figure 3.2* the result is a relatively linear function. The armature resistance is approximated directly as the slope of the least square line:

$$R_a = 0{,}178\,\Omega \quad (3.2)$$

Bibliography

[1] Yongwang Ding and Ramesh Harjani. *High-Linearity CMOS RF Front-End Circuits*. 2006.

[2] Biezl. *Vierquadrantensteller*. Oct. 23, 2010. URL: https://commons.wikimedia.org/wiki/File:Vierquadrantensteller.svg (visited on 12/15/2015).

List of Corrections

Note: Remember source 2

Note: This however does work in the footnote 2