AN M.S. THESIS OR PH.D. DISSERTATION EXTENDED ILLUSTRATION SAMPLE GENERATED - USING THE NEW "NDSU-THESIS-2022" LaTeX CLASS AND TEMPLATE

A Dissertation
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

Samuel Quincy Student

In Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF PHILOSOPHY

Major Department:
Mathematics

December 2023

Fargo, North Dakota

North Dakota State University

Graduate School

Title

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The Supervisory Committee certifies that this ***dissertation*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

DOCTOR OF PHILOSOPHY

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ABSTRACT

Note: All the sample text from the example thesis and dummy text are in black and other instructions by the author are shown in color to draw users' attention. It should be noted that for the NDSU actual thesis/dissertation only black text should be used in general!

This is the abstract for my thesis.

This document uses the new: **ndsu-thesis-2022.cls** class and **mybib.bib** file storing the bibliography database. NDSU has word count limitations and that should be adhered to. URL: https://www.ndsu.edu/gradschool/current_students/graduation/theses_dissertations_papers/disquisition_formatting: "Margins must be at least 1 in on each side of the page. Page number margins must be at least 0.75 in from the bottom of the page. Abstracts appear after the Disquisition Approval page and begin on page iii of the disquisition. Abstracts for dissertations may not exceed 350 words. Abstracts for thesis and papers may not exceed 150 words."

One the useful resources to learn LaTeX is: https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes?utm_source=overleaf&utm_medium=email&utm_campaign=onboarding And others include (details in REFERENCES): (1) The Not So Short Introduction to LaTeX 2_ε, (2) A Guide to LaTeX and Electronic Publishing, and (3) LaTeX – A Document Preparation System.

Several features such as newcommand - shortcuts, longtable - spanning more pages, threeparttable - table notes, tables spanning the entire width (tabu), subfigures - side-by-side figures, tikz - code-generated vector figures, itemize - bullet list, enumerate - number list, matrix, advanced math, various symbols, etc., can be inserted into the thesis following

standard resource materials. All the general LaTeX based commands and features will work in the NDSU LaTeX thesis class.

— C. Igathinathane

Ag & Bio Sys Eng, NDSU

ACKNOWLEDGEMENTS

I acknowledge people here.

DEDICATION

This thesis is dedicated to my cat, Mr. Fluffles.

PREFACE

You can put a preface here.

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LIST OF SCHEMES

LIST OF ABBREVIATIONS

AC ..... alternating current

AGL ..... above ground level

API ..... application programming interface

NDSU ..... North Dakota State University

ZL ..... zeta tevel

LIST OF SYMBOLS

A ..... area (m^2)

e ..... Euler's constant (2.718 281 828)

R^2 ..... coefficient of determination

T ..... time (s)

v ..... velocity ($m\,s^{-1}$)

x ..... x-coordinate of image pixel

y ..... y-coordinate of image pixel

σ ..... standard deviation

γ ..... hyperparameter in SVM

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1. EQUATIONS IN THESIS/DISSERTATION — GENERAL PRINCIPLES

1.1. Abbreviations, Variables, Subscripts, and Indices

Equations should follow the established convention — and loosely coding the equation and its elements is simply unprofessional. In general, such conventions, if not taken specific care, will be overlooked and the user feels no harm done. It was noticed that several published papers carry these mistakes — which will not make it right and users should not follow a bad example.

1.2. Some Examples of Correctly Formatted Equations

Some examples of correctly formatted equations.

$$y = mx + c; \qquad E = m \times c^2 \tag{1.1}$$

Here all symbols are variable and in *italics*.

$$\text{Sum} = \sum_{i=1}^{n} x_i \tag{1.2}$$

Check the use of text, subscript, and indices.

$$\text{Percent}_{\text{change}} = \frac{V_{\text{new}} - V_{\text{old}}}{V_{\text{old}}} \times 100 \tag{1.3}$$

$$\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}} \tag{1.4}$$

$$\text{Recall} = \frac{\text{TP}}{\text{TP} + \text{FN}} \tag{1.5}$$

$$\text{F1 score} = \frac{2\,(\text{Precision} \times \text{Recall})}{\text{Precision} + \text{Recall}} \tag{1.6}$$

$$\text{CR}_{\text{lim}} = B / \sum_{m=1}^{x} \left(\frac{C_m}{\text{RfD}_m} \right) \tag{1.7}$$

Check the use of text, subscripts, variables, and indices.

1.3. Convention and Expectations with Equations

Shown below are the rules that can be followed while working with equations:

Table 1.1. Equation coding conventions — Dos and dont's with examples

Item	**Correct form — Do**	**Wrong form — Don't**	**Remarks**
Abbreviations	ABEN, STD, TP, TN, FP, FN	$ABEN, STD, TP, TN, FP, FN$	Abbreviations, usually >1 letter long, should be always upright. This should be followed in regular text and in equations (use the `\text{...}` in equations). Otherwise, it may be considered as a product of variables.
Variables	T, P, V, t, v	T, P, V, t, v	Variables, usually 1 letter long, should be always be typeset in italics. The italics font signifies technical symbols of variables (e.g., temperature, pressure, volume, time, velocity).
Subscripts and superscripts	T_{avg}, TP_{max}, $\text{RMSE}_{\text{observed}}$, v^{in}, t^{output}, $P^{\text{top}}_{\text{min}}$	T_{avg}, TP_{max}, $\text{RMSE}_{observed}$, v^{in}, t^{output}, P^{top}_{min}	Subscripts and superscripts, usually >1 letter long, should always be typeset upright.
Index	$i, j, k, l, m,$ $x_i, y_j, z_1, \theta_{23}$	i, j, k, l, m, $x_{\text{i}}, y_{\text{j}}, z_1, \theta_{23}$	Indices, usually 1 letter long, should be always be typeset in italics and not upright. However, numbers should always be upright.
Standard operations	abs, sin, cos, min, max	abs, sin, cos, min, max	Standard operations are usually formatted upright. In LaTeX when coded in "math" mode or equation environment these operations will always come out upright.
Final thought!	$\rightarrow$	$\rightarrow$	Symbols T and T, and t and t are technically different quantities.

2. TABLES IN THESIS/DISSERTATION — REGULAR-STYLED CHAPTER

2.1. Simple Tables

Users are encouraged to refer to the Sec. 8.1 of the NDSU Class Documentation before seeing some of the examples presented in this chapter. Shown below is the most basic table using LaTeX `tabular` environment. Vertical lines (created by "pipe" character |), which are not generally used in professional tables, are shown to illustrate the column widths. However, | can be used for visualization during table development.

Table 2.1. Simple fixed-width table with left-justified top caption.

Number (left)	Our rating (center)	Month (right)
1	Colder	January
2	Okay	February
3	Good	March

The code generated this table (table 2.1) in single-spacing is shown below:

```
\begin{table}[h!]
\centering
\caption{Simple fixed-width table with left-justified top caption.}
\begin{tabular}{| l |c| r |}
\hline
Number & Our rating & Month \\
(left) & (center)   & (right)\\
\hline
1 & Colder & January \\
2 & Okay   & February \\
3 & Good   & March\\
\hline
\end{tabular}
\label{tab21}
\end{table}
```

The same table (table 2.1) will be made as a professional table, as seen in published articles (table 2.2), using `booktabs` package. The only change is removing | and replacing the generic `\hline` with appropriate commands such as `\toprule`, `\midrule` (less thick), and `\bottomrule` that produce different line thicknesses.

```
\begin{table}[h!]
\centering
\caption{Professional fixed-width table with left-justified top caption
 using \texttt{booktabs} package.}
\begin{tabular}{ l c r }
\toprule
Number & Our rating & Month \\
(left) & (center)   & (right)\\
\midrule
1 & Colder & January \\
2 & Okay   & February \\
3 & Good   & March\\
\bottomrule
\end{tabular}
\label{tab22}
\end{table}
```

Table 2.2. Professional looking fixed-width table with left-justified top caption using `booktabs` package.

Number (left)	Our rating (center)	Month (right)
1	Colder	January
2	Okay	February
3	Good	March

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that

is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.1.1. Tables with Fewer Columns

NDSU recommends that fewer column tables can be coded in a compact manner using fixed-width for readability, while tables with more columns can run the full-width or made into landscape tables. Compact tables with fewer columns are common and readily made by the common `tabular` and `table` environment (table 2.3).

Table 2.3. Fixed-width whole table left-justified with footnote.

Number (left)	Our rating (center)	Month (right)	Days (center)
1	Colder	January	31
2	Okay	February	28
3	Good	March	31

Note: 1. Footnote using \multicolumn.
Note: 2. Footnote using \multicolumn.
Note: 3. In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories.

Where the columns will be based on the width of the widest entries and the columns will be naturally spaced and result in a compact table with the total width usually less than the textwidth. No special action is necessary to make these tables. Tables of fewer columns and narrower widths need to be positioned on the page consistently. Either all of them left-justified or centered. Footnotes corresponding to the width of the table can be coded through the `\multicolumn{no of cols}{lcr}{text}\\` for single line items or `\multicolumn{no of cols}{p{dimension}}{text}` for footnotes that run like a paragraph (table 2.3). The width

of the footnote is controlled by the amount of text or the dimension of the paragraph (refer to the "`NDSU-Thesis-Extended.tex`" for an example codes).

2.2. Help with LaTeX Tables

The code for the Tables 2.2 and 2.3 may be a bit intimidating (really?), but it is just two nested environments (`table` and `tabular`). The layout is: `table{` – `caption` – `tabular{` – data rows – `tablular}` – `label` – `table}`. This layout when looked at in an overall manner is simple and all tables follow the same pattern.

LaTeXinstallations will have some tools (e.g., IntelliSense code completion) that allow to develop table codes from scratch or paste the copied table data from spreadsheets (e.g., "Paste Spreadsheet Cells – booktabs" in Mac) make table creation easy. Also, there are several online tools Table Generator and LaTeX Tables Editor among others will help generate table codes from typed data, and imported files (*.csv, *.xls, etc.,). Also, Excel Add-Ins such as Excel2LaTeX will generate and export the table codes.

2.3. Full-width Tables

Unlike short width tables with a few columns (tables 2.1 to 2.3), based on the width of columns and width exceeds about 60 %, it will be better to opt for full-width tables that look aligned with the surrounding text. We have two methods of achieving the full-width tables when required.

2.3.1. Manual Method — Using Table Column Width

One simple method is trial-and-error (manual) is to increase the tabular column separation width so that the table width fits the text width. The two commands `\setlength{\tabcolsep}{0.75in}` (value of 0.34in obtained by trial-and-error) and `\begin{tabular}{ l| c| r| c| c }` (rest of the code remains the same as in table 2.2) created the table below (table 2.4).

It is possible to calculate the `tabcolsep` based on the width of text elements and the number of gaps (2 * number of columns) with the use of `\settowidth{...}` and `\fpeval{...}` commands. Note the use of | was used for visualization (not to be used in professional documents).

Table 2.4. Professional looking full-width table using `\tabcolsep` and `booktabs` package.

Number (left)	Our rating (center)	Month (right)	Days (number)	Rating (stars)
1	Colder	January	31	**
2	Okay	February	28	***
3	Good	March	31	*****

It can be seen that the table column separation (`tabcolsep`) value of 0.34in was applied on both sides of the text in each column. The vertical spaces at the start (left) and end (right) are not working well with the `l` and `r` specifications for the 1st and 3rd columns set in the `tabular` environment. Had all columns been centered then this would have worked.

To address and suppress these spaces, the control sequence `@{...}` can be used. When the spaces were removed, the table width will reduce and should be increased (1.1in used) accordingly. Thus, with the following code, the table (table 2.5) was created where columns align per our expectations.

```
\setlength{\tabcolsep}{0.41in}
\begin{tabular}{ @{ }l|   c|   r|   c|   c@{ }}
```

This table (table 2.5), of course without the vertical lines (|), can be used in NDSU disquisition. The issue of such vertical space management will be prevalent only with fewer columns.

Table 2.5. Professional looking full-width table using \tabcolsep, @{...}, and booktabs package.

Number (left)	Our rating (center)	Month (right)	Days (number)	Rating (stars)
1	Colder	January	31	**
2	Okay	February	28	***
3	Good	March	31	*****

2.3.2. Automatic Method — Using tblr Environment - Equal Widths

The automatic method using the tblr environment replacing the tabular makes it simple and avoids the guesswork in fixing the table width. The following code (rest of the code is same as Table 2.2, page: 4) that reproduces the table 2.5 and the generated output (table 2.6) are:

```
. . . .
\begin{tblr}{X|  X[c]|  X[r]|  X[c]|  X[r]} % tabular replaced by tblr
. . . .
\end{tblr} % tabular replaced by tblr
. . . .
```

Table 2.6. Professional looking automatic full-width table using tblr environment and booktabs package.

Number (left)	Our rating (center)	Month (right)	Days (number)	Rating (stars)
1	Colder	January	31	**
2	Okay	February	28	***
3	Good	March	31	*****

From the code it can be seen that the full-width table can be easily made using the tblr environment. The X column specifier allots column widths automatically so that the table spans the full-width. The other parameter enclosed by square brackets extends the

functionality of the `X` column. Thus, `X[c]` and `X[r]` specify centering and right-justification of the column content, while left-justification is the default.

Now the Table 2.6 is revised as Table 2.7 so that it is appropriate for the thesis or paper. Row spacing of the automatic full-width table `tblr is adjusted by \SetTblrInner{rowsep = xxx}`

Table 2.7. Professional looking automatic full-width table using `tblr` environment.

Number (left)	Our rating (center)	Month (right)	Days (number)	Rating (stars)
1	Colder	January	31	**
2	Okay	February	28	***
3	Good	March	31	*****

2.3.3. Automatic Method — Using `tblr` Environment - Unequal Widths

Shown below is an advanced table (table 2.8) with variable column widths and overall math-column specification. Variable widths can be specified using coefficients to `X` columns.

The code that created this `tblr` environment is given below. For full code, the users are encouraged to refer to the source `*.tex` file of this document.

```
. . . .
\setlength{\tabulinesep}{0.85ex} % constant vertical spacing between rows
\begin{tblr}{X[2] X[0.8, $]}
. . . .
```

The environment specifies 2 columns with the first having a proportional 2 as width (`coef`) and the second having 0.8 as width. Stated otherwise, the first column is 2.5 (2/0.8) times the width of the second ($2 : 0.8 = 2.5 : 1$). The second column type was also specified using $, which makes the entire column math, and the column code can be input without enclosing items between $\ldots$, as usually done in math mode. This math column specifica-

Table 2.8. Full-width table using the `tblr` environment showing some vegetative indices formulas demonstrating the use of `X` column code with variable column widths and math column specifications (`X[0.8, $]`).

Segmentation method	Formula
Excess green segmentation (ExG)	$2G - R - B$
Visible atmospherically resistant index (VARI)	$\dfrac{G - R}{(G + R - B)}$
Red green ratio index (RGRI)	$\dfrac{R}{G}$
Excess red index (ExR)	$1.3R - G$
Excess green minus excess red (ExGR)	ExG − ExR
Normalized green - red difference index (NGRDI)	$\dfrac{(G - R)}{(G + R)}$
Vegetative index (VI)	$\dfrac{G}{R^a B^{(1-a)}}$
Modified excess green index (MExG)	$1.262G{-}0.884R{-}0.311B$
Green chromatic coordinate (GCC)	$\dfrac{G}{(R + G + B)}$
Color index vegetation extraction (CIVE)	$0.441R{-}0.811G{+}0.385B$
Simple text in math column right (See ⇒)	NDSU thesis class

Note: R, G, B stands for red, green, blue pixel values from the RGB color image.

tion will be convenient when the column predominantly contains math entries. Of course, regular entries can be input as `\text{...}`, as done in the last row of the table 2.8.

Of course the manual method can also produce the table 2.8 and the output is presented in table 2.8. While the full code can be seen in the source code the important code segments and two rows of entries are shown as follows:

```
. . . .
\setlength{\tabcolsep}{7ex}
\begin{tabular}{@{\:}l l@{\:}}
. . . .
Visible atmospherically resistant index (VARI)   & $\dfrac{{G - R}}
{(G + R - B)}$ \\[2ex]
Red green ratio index (RGRI)      & $\dfrac{R}{G}$\\[2ex]
. . . .
```

Table 2.9. Full-width table using the manual method showing some vegetative indices formulas — Reproduction of table 2.7.

Segmentation method	Formula
Excess green segmentation (ExG)	$2G - R - B$
Visible atmospherically resistant index (VARI)	$\frac{G - R}{(G + R - B)}$
Red green ratio index (RGRI)	$\frac{R}{G}$
Excess red index (ExR)	$1.3R - G$
Excess green minus excess red (ExGR)	ExG − ExR
Normalized green - red difference index (NGRDI)	$\frac{(G - R)}{(G + R)}$
Vegetative index (VI)	$\frac{G}{R^a B^{(1-a)}}$
Modified excess green index (MExG)	$1.262G - 0.884R - 0.311B$
Green chromatic coordinate (GCC)	$\frac{G}{(R + G + B)}$
Color index vegetation extraction (CIVE)	$0.441R - 0.811G + 0.385B$
Simple text in regular column right (See ⇒)	NDSU thesis class

Note: R, G, B stands for red, green, and blue pixel values from the RGB color image.

In the code `tabcolsep` command was used (table 2.8). The formula column uses the math mode \$...\$ for all the rows. Also, for increasing the row vertical spacing because of the a/b format of the formula the code of \\[2ex] was used.

When compared, the automatic method (table 2.8) is simpler than the manual method (table 2.9); however, both produce similar output visually.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that

is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.3.4. Another Example with Multicolumn and Cmidrule

Usage of `multicolumn` and `cmidrule` in full-width tables using manual and automatic are presented (tables 2.9 and 2.10) in this example. Only the significant code lines that produced these tables are given subsequently.

```
. . . . %Table 2.9
\setlength{\tabcolsep}{0.675in}
\begin{tabular}{|@{\:}l |c|l| l@{\:}|}
. . . .
\cmidrule(lr){3-4}
2 & February & \multicolumn{2}{c}{\hspace{5ex}Combined February}\\
\cmidrule(lr){3-4}
```

Table 2.10. Manual method full-length table showing multicolumn and rule.

Number	Month	Same	Same
1	January	January	January
1	January	January	January
2	February	Combined February	
3	March	March	March
3	March	March	March

```
. . . . %Table 2.9
\begin{tblr}{| X[1.25] | X[4.75,c] | X[3] | X |}
\cmidrule(lr){3-4}
2 & February & \multicolumn{2}{c}{Combined February}\\
. . . .
\midrule
4 & March & March is the month of joy for some and means yard
work for some other! & March \\
\cmidrule(lr){3-4}
```

Table 2.11. Automatic method full-length table showing multicolumn and rule. The following command \cmidrule[lr]{3-4} was used.

Number	Month	Same	Same
1	January	January	January
1	January	January	January
2	February	Combined February	
3	March	March	March
3	March	March	March
4	March	March is the month of joy for some and means yard work for others!	March

Both tables are visually the same barring the different column widths visualized using |, but their mechanisms are different. It can also be seen that the `tblr` Table 2.11 can handle lengthy text in "paragraph" mode automatically, which lengthy text will increase the column width (to fit the text) in the manual method. Based on the requirements, the users can use any of these methodologies.

2.4. Landscape Tables

When more columns need to be accommodated in tables that cannot be handled in the regular orientation, with available text width of about 6.5 in, the landscape that can utilize the text height of 8.75 in for the table contents. If even more columns have to be packed then the use of `\resizebox` command can scale down the table to the required size, and this can be used in regular and landscape modes.

Landscape tables were usually set on a separate page using `[p]` placement specifier. With the `pdflscape` package that provides the `landscape` environment for the table creation, the page is also rotated for direct viewing of the table, but prints correctly. An example of

a landscape table is shown in Table 2.12. More information about this table is available in the table caption and footnote. The source code of this table can be referred to for details.

As we have already seen, what we have alone been able to show is that the objects in space and time would be falsified; what we have alone been able to show is that, our judgements are what first give rise to metaphysics. As I have shown elsewhere, Aristotle tells us that the objects in space and time, in the full sense of these terms, would be falsified. Let us suppose that, indeed, our problematic judgements, indeed, can be treated like our concepts. As any dedicated reader can clearly see, our knowledge can be treated like the transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. Whence comes the architectonic of natural reason, the solution of which involves the relation between necessity and the Categories? Natural causes (and it is not at all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

Table 2.12. Landscape table uses `landscape` environment from `pdflscape` package (loaded in the class). Landscape tables are set on a separate page using `[p]` and usually don't have surrounding text, which makes sense. With the `p` specifier the table is also centered vertically, otherwise with `h` and `t` will start from the top, and `\vspace*` command needs to be used to bring it down. The `\columnwidth` in the landscape mode is = 8.87499999 in. Note this table was resized using `\resizebox` command — Check the source code for details.

Row-of-values	Block1				Block2				Block3				Value A	Value B
	Value A	Value B	Value C	Value D	Value A	Value B	Value C	Value D	Value A	Value B	Value C	Value D		
1	0.6010	0.9534	0.0230	0.2792	0.6536	0.6743	0.6670	0.7151	0.9233	0.0136	0.7240	0.7884	0.6380	0.4722
2	0.0879	0.5224	0.5080	0.8831	0.4167	0.9331	0.2338	0.4526	0.6214	0.1434	0.9304	0.5150	0.3284	0.2733
3	0.5354	0.5622	0.9666	0.3658	0.2022	0.7481	0.0094	0.3730	0.6100	0.4873	0.3478	0.3655	0.2236	0.3613
4	0.5149	0.7877	0.7046	0.7844	0.8712	0.1463	0.6431	0.0756	0.2670	0.2400	0.8599	0.5413	0.3102	0.3564
5	0.2776	0.8775	0.0204	0.3931	0.1757	0.7755	0.7601	0.6077	0.1814	0.1600	0.3897	0.9181	0.5436	0.7620
6	0.4873	0.1049	0.7446	0.3470	0.1444	0.0765	0.6868	0.7974	0.6107	0.4752	0.3983	0.3813	0.4250	0.7448
7	0.4924	0.2721	0.6291	0.4191	0.9174	0.2786	0.3453	0.6789	0.2796	0.2995	0.0936	0.5531	0.6751	0.8136
8	0.1246	0.5249	0.9767	0.1850	0.0554	0.7529	0.8975	0.6367	0.1115	0.1917	0.7160	0.8446	0.4325	0.0693
9	0.8376	0.3821	0.4961	0.6293	0.5149	0.4190	0.6207	0.2706	0.6919	0.7676	0.0739	0.8534	0.1713	0.8018
10	0.2861	0.3240	0.9193	0.6021	0.2301	0.9783	0.1213	0.5350	0.4845	0.5200	0.0642	0.2804	0.7556	0.0147

Note: The `\cmidrule(lr){2-9}` and `\cmidrule(lr){10-15}` commands issued after 3rd and 7th rows produced the horizontal lines separating the rows 3 and 4, and 8 and 9, respectively. This command can be used to mark grouped columns as well. The grouped (merged) column headings (Block1, Block2, and Block3) were created, for example, by `\multicolumn{4}{c}{Block1}` command. Check the code for how other groups and lines were made.

Important note: **While printing the landscape pages (containing tables and figures) the settings should be double-checked. Adobe Reader was known to print landscape pages in the correct format. Mac Preview was observed not to give the correct output (distortion observed) at the time of this writing.**

2.5. Long Tables

In the disquisition sometimes it is necessary to present data and results that go more than a single page. In such situations, long tables should be used and the package developed for this purpose and included in the class was `longtable` and it works well with `threeparttable` package as well. The `longtable` environment is used. For automatic full-width long tables the `tabularray`'s `longtblr` environment is used.

The long tables have more components than regular tables (section 2.5.1). Long tables contain, in general, main title, running title, running table head, running footnote, and table final footnote. Users are urged to refer to the documentation of `longtable` and the source code for more details, as there are several aspects involved in long table creation. Referring to the long tables can be done by defining the `label` right inside the `longtable` environment and referring it in the usual way (section 2.5.1 and Section 2.5.1).

2.5.1. Longtable 1: Elaborate Long Table

Table 2.13. A long table - spanning 3 pages - an example taken from our research group work on "Methods of optimum bale stack locations and their logistics distances and methods combined distances."

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)
0.41 [1]	3	Origin	0.196	0	0.196	0.070	0.045
		Field middle	0.085	0.045	0.130		
		Middle data range	0.070	0.061	0.131		
		Centroid	0.068	0.062	0.130		
		Geometric median	0.065	0.064	0.129		
		Medoid	0.068	0.075	0.143		
0.51 [1.25]	4	Origin	0.240	0	0.240	0.054	0.048
		Field middle	0.107	0.050	0.158		
		Middle data range	0.108	0.052	0.160		

continued . . .

Table 2.13. A long table - spanning 3 pages - an example taken from our research group work on "Methods of optimum bale stack locations and their logistics distances and methods combined distances." – *(continued).*

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)
		Centroid	0.102	0.057	0.159		
		Geometric median	0.099	0.067	0.166		
		Medoid	0.101	0.072	0.172		
1.01	8	Origin	0.462	0	0.462	0.095	0.051
[2.5]		Field middle	0.404	0.142	0.546		
		Middle data range	0.205	0.109	0.315		
		Centroid	0.206	0.114	0.320		
		Geometric median	0.205	0.109	0.314		
		Medoid	0.206	0.103	0.308		
2.02	18	Origin	1.80	0	1.80	0.054	0.034
[5]		Field middle	0.87	0.30	1.17		
		Middle data range	0.87	0.30	1.17		
		Centroid	0.86	0.31	1.17		
		Geometric median	0.86	0.31	1.18		
		Medoid	0.89	0.35	1.24		
4.05	33	Origin	5.26	0	5.26	0.144	0.100
[10]		Field middle	3.11	0.85	3.96		
		Middle data range	3.11	0.86	3.97		
		Centroid	3.11	0.86	3.97		
		Geometric median	3.11	0.88	3.99		
		Medoid	3.45	1.09	4.53		
8.09	67	Origin	14.63	0	14.63	0.024	0.021
[20]		Field middle	7.29	2.41	9.71		
		Middle data range	7.29	2.43	9.72		
		Centroid	7.29	2.43	9.72		
		Geometric median	7.28	2.45	9.73		
		Medoid	7.29	2.41	9.70		
16.19	133	Origin	40.67	0	40.67	0.074	0.072
[40]		Field middle	20.28	6.54	26.82		
		Middle data range	20.29	6.61	26.89		
		Centroid	20.28	6.51	26.79		
		Geometric median	20.28	6.58	26.86		

continued . . .

Table 2.13. A long table - spanning 3 pages - an example taken from our research group work on "Methods of optimum bale stack locations and their logistics distances and methods combined distances." – *(continued).*

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)
		Medoid	20.52	6.88	27.39		
32.38 [80]	270	Origin	117.89	0	117.89	0.060	0.052
		Field middle	58.92	18.11	77.03		
		Middle data range	58.92	18.22	77.14		
		Centroid	58.92	18.16	77.08		
		Geometric median	58.92	18.19	77.11		
		Medoid	59.18	18.11	77.29		
64.75 [160]	540	Origin	333.12	0	333.12	0.049	0.043
		Field middle	166.52	51.21	217.73		
		Middle data range	166.53	51.41	217.93		
		Centroid	166.52	51.26	217.78		
		Geometric median	166.52	51.30	217.82		
		Medoid	166.81	51.23	218.05		
129.5 [320]	1082	Origin	943.38	0	943.38	0.051	0.029
		Field middle	470.83	145.65	616.48		
		Middle data range	470.83	145.79	616.62		
		Centroid	470.83	145.91	616.74		
		Geometric median	470.83	145.83	616.66		
		Medoid	471.26	148.53	619.79		
259 [640]	2163	Origin	2665.34	0	2665.34	0.028	0.027
		Field middle	1331.20	410.81	1742.01		
		Middle data range	1331.21	411.45	1742.66		
		Centroid	1331.19	411.07	1742.27		
		Geometric median	1331.19	411.25	1742.44		
		Medoid	1331.32	407.51	1738.83		
517 [1280]	4324	Origin	7531.35	0	7531.35	0.022	0.020
		Field middle	3765.75	1160.34	4926.09		
		Middle data range	3765.77	1160.95	4926.72		
		Centroid	3765.75	1160.51	4926.26		
		Geometric median	3765.75	1160.39	4926.15		
		Medoid	3765.86	1159.71	4925.57		

continued . . .

Table 2.13. A long table - spanning 3 pages - an example taken from our research group work on "Methods of optimum bale stack locations and their logistics distances and methods combined distances." – *(continued).*

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)
517	4324	Origin	7531.35	0	7531.35	0.022	0.020
[1280]		Field middle	3765.75	1160.34	4926.09		
Again		Middle data range	3765.77	1160.95	4926.72		
Again		Centroid	3765.75	1160.51	4926.26		
Again		Geometric median	3765.75	1160.39	4926.15		
Again		Medoid	3765.86	1159.71	4925.57		

† MD - Methods distance i.e. total polygonal distance of all methods taken in the selected order
‡ TSP - Traveling salesperson distance i.e., total polygonal distance of all methods following traveling salesman technique; Origin was the outlet location where bales were finally transported; and medoid was the aggregation method where it coincided on one of the field stacks but other methods may not.

As any dedicated reader can clearly see, the Ideal of practical reason is a representation of, as far as I know, the things in themselves; as I have shown elsewhere, the phenomena should only be used as a canon for our understanding.

2.5.2. Longtable 2: Simplified Long Table — No Repeated Caption and Header

The centering is done by `\LTleft` and `\LTright` values. Row spacing by `\arraystretch` command. No footer or header "Continued ..." coded. Enclosing group environment is necessary.

Table 2.14. Most simple longtable — Caption is not repeated. Let us make it long enough so that it goes to two lines and makes some noise there while it was there.

First column	Second column	Data	Where?
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...

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One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...

One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
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One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .

As any dedicated reader can clearly see, the Ideal of practical reason is a representation of, as far as I know, the things in themselves; as I have shown elsewhere, the phenomena should only be used as a canon for our understanding. The paralogisms of practical reason are what first give rise to the architectonic of practical reason.

2.5.3. Longtable 3: Simplified Long Table — With Header But No Repeated Caption

The centering is done by `\LTleft` and `\LTright` values. Row spacing by `\arraystretch` command. Specifying `\endfirsthead` suppresses the repeated caption, and `\endhead` puts the header on each page. Footer or header "Continued . . ." coded. Footnotes are coded

with \endlastfoot command with \multicolumn using manual width. Enclosing group environment is necessary.

Table 2.15. With repeating header row - A good caption need to be developed for this table - Let us make it long enough and some more and here we go.

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
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One	abcdef ghjijklmn	123.456778	Go go go go ...	
One	abcdef ghjijklmn	123.456778	Go go go go ...	

Continued ...

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go . . .	
One	abcdef ghjijklmn	123.456778	Go go go go . . .	
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First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778		
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One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
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One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539

Continued . . .

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539

Note: My footnote for the table is coded here. Longer note below.

Note: In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.5.4. Longtable 4: Simplified longtblr — With Header But No Repeated Caption

Since it is automatic full-width no centering is necessary. Row spacing by `spacing` command (others are ineffective with the class). The necessary codes (caption, footnote, column specifications, etc.) are input inside of `\longtblr` optional [...] and regular argument {...}. Enclosing group environment is necessary. As this is un-numbered table the table's serial number should be reduced by 1 using the command `\addtocounter{table}{-1}` after the table code (as applied at the end).

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539

Continued ...

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
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One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		

Continued ...

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
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One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778	Go go go go …	
One	abcdef ghjijklmn	123.456778	Go go go go …	
One	abcdef ghjijklmn	123.456778	Go go go go …	
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539

Continued …

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539

Note: Test

Note: In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.5.5. Longtable 5: Simplified Longtable — With No Header or Repeated Caption - Used to Present Just Long Data

The centering is done by `\LTleft` and `\LTright` values. Row spacing by `\arraystretch` command. Captions, rules, etc. are not used in this data-style long table. Row spacing by `\arraystretch` command. Enclosing group environment is necessary. The table counter number should be adjusted for this no-caption table.

Part A	Part B	Part C
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
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It is	not clear	what you want

Hmmm	This is not	how I want it
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It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want
Hmmm	This is not	how I want it
It is	not clear	what you want

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.5.6. Longtable 6: Simplified Longtblr — With No Header or Repeated Caption - Used to Present Just Long Data

Since it is automatic full-width no centering is necessary. Row spacing by `spacing` command (others are ineffective with the class). The necessary codes to be input inside of `\longtblr` optional [...] and regular argument {...} are not done suppress. The entry = none will make the table not listed in TOC. Bottom `\hrule` should be kept outside of

`longtblr` so that it does not repeat on every page. Enclosing group environment is necessary.

The table counter number should be adjusted for this no-caption table.

This is a multipage data table using longtblr that will not feature in the TOC — the barebone style

Number	Twice	Squared	Fourth power
0	0	0	0
15	30	225	50 625
30	60	900	810 000
45	90	2025	4 100 625
60	120	3600	12 960 000
75	150	5625	31 640 625
90	180	8100	65 610 000
105	210	11 025	121 550 625
120	240	14 400	207 360 000
135	270	18 225	332 150 625
150	300	22 500	506 250 000
165	330	27 225	741 200 625
180	360	32 400	1 049 760 000
195	390	38 025	1 445 900 625
210	420	44 100	1 944 810 000
225	450	50 625	2 562 890 625
240	480	57 600	3 317 760 000
255	510	65 025	4 228 250 625
270	540	72 900	5 314 410 000
285	570	81 225	6 597 500 625
300	600	90 000	8 100 000 000
315	630	99 225	9 845 600 625
330	660	108 900	11 859 210 000
345	690	119 025	14 166 950 625
360	720	129 600	16 796 160 000
375	750	140 625	19 775 390 625
390	780	152 100	23 134 410 000
405	810	164 025	26 904 200 625
420	840	176 400	31 116 960 000
435	870	189 225	35 806 100 625
450	900	202 500	41 006 250 000
465	930	216 225	46 753 250 625

480	960	230 400	53 084 160 000
495	990	245 025	60 037 250 625
510	1020	260 100	67 652 010 000
525	1050	275 625	75 969 140 625
540	1080	291 600	85 030 560 000
555	1110	308 025	94 879 400 625
570	1140	324 900	105 560 010 000
585	1170	342 225	117 117 950 625
600	1200	360 000	129 600 000 000
615	1230	378 225	143 054 150 625
630	1260	396 900	157 529 610 000
645	1290	416 025	173 076 800 625
660	1320	435 600	189 747 360 000
675	1350	455 625	207 594 140 625
690	1380	476 100	226 671 210 000
705	1410	497 025	247 033 850 625
720	1440	518 400	268 738 560 000
735	1470	540 225	291 843 050 625
750	1500	562 500	316 406 250 000
765	1530	585 225	342 488 300 625
780	1560	608 400	370 150 560 000
795	1590	632 025	399 455 600 625
810	1620	656 100	430 467 210 000
825	1650	680 625	463 250 390 625
840	1680	705 600	497 871 360 000
855	1710	731 025	534 397 550 625
870	1740	756 900	572 897 610 000
885	1770	783 225	613 441 400 625
900	1800	810 000	656 100 000 000
915	1830	837 225	700 945 700 625
930	1860	864 900	748 052 010 000
945	1890	893 025	797 493 650 625
960	1920	921 600	849 346 560 000
975	1950	950 625	903 687 890 625
990	1980	980 100	960 596 010 000
1005	2010	1 010 025	1 020 150 500 625
1020	2040	1 040 400	1 082 432 160 000
1035	2070	1 071 225	1 147 523 000 625
1050	2100	1 102 500	1 215 506 250 000

1065	2130	1 134 225	1 286 466 350 625
1080	2160	1 166 400	1 360 488 960 000
1095	2190	1 199 025	1 437 660 950 625
1110	2220	1 232 100	1 518 070 410 000
1125	2250	1 265 625	1 601 806 640 625
1140	2280	1 299 600	1 688 960 160 000
1155	2310	1 334 025	1 779 622 700 625
1170	2340	1 368 900	1 873 887 210 000
1185	2370	1 404 225	1 971 847 850 625
1200	2400	1 440 000	2 073 600 000 000
1215	2430	1 476 225	2 179 240 250 625
1230	2460	1 512 900	2 288 866 410 000
1245	2490	1 550 025	2 402 577 500 625
1260	2520	1 587 600	2 520 473 760 000
1275	2550	1 625 625	2 642 656 640 625
1290	2580	1 664 100	2 769 228 810 000
1305	2610	1 703 025	2 900 294 150 625
1320	2640	1 742 400	3 035 957 760 000
1335	2670	1 782 225	3 176 325 950 625
1350	2700	1 822 500	3 321 506 250 000
1365	2730	1 863 225	3 471 607 400 625
1380	2760	1 904 400	3 626 739 360 000
1395	2790	1 946 025	3 787 013 300 625
1410	2820	1 988 100	3 952 541 610 000
1425	2850	2 030 625	4 123 437 890 625
1440	2880	2 073 600	4 299 816 960 000
1455	2910	2 117 025	4 481 794 850 625
1470	2940	2 160 900	4 669 488 810 000

2.6. Longtable 7: Simple Long Data Table Using `tabbing` Environment

The `tabbing` environment offers the most simple way of developing data table (always left-justified; no TOC entries) and `tabbing` entries automatically flow through pages (longtable). The tabs can be defined according to requirements. The tab stops can be adjusted to move the entire table or column widths manually. As the tabbing environment is not a table, it will not affect the numbering of the tables.

1st column	2nd column	3rd column
123	2345	34567
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123	2345	34567
123	2345	34567
123	2345	34567
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The first column is left-justified - shown below (3 tabs = 4 columns)

Left 123 2345 34567
Left 123 2345 34567
Left 123 2345 34567
Left 123 2345 34567
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123 2345 34567
123 2345 34567

Blank line by \\and shown below

As is shown in the writings of Aristotle, the things in themselves (and it remains)

123 2345 34567
123 2345 34567
123 2345 34567

Tabs can be skipped or not filled - text flows through columns

Left - Tabs can be skipped or not filled
Tabs can be skipped or not filled
Tabs can be skipped or not filled
Tabs can be skipped or not filled
123 2345 34567
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123	2345	34567
123	2345	34567

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

2.7. Longtable 8: Landscape Long Tables

Applying the similar logic `longtable` when enclosed in `landscape` environment will produce the landscape long tables (section 2.7). The previous table was reproduced to demonstrate long tables in landscape format.

Table 2.16. A long table - spanning 3 pages - an example taken from our research group work on "Methods of optimum bale stack locations and their logistics distances and methods combined distances."

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)	NColumn1 ($)	NColumn2 ($)	NColumn3 ($)
0.41	3	Origin	0.196	0	0.196	0.070	0.045	123	234	345
[1]		Field middle	0.085	0.045	0.130					
		Middle data range	0.070	0.061	0.131					
		Centroid	0.068	0.062	0.130					
		Geometric median	0.065	0.064	0.129					
		Medoid	0.068	0.075	0.143					
0.51	4	Origin	0.240	0	0.240	0.054	0.048	123	234	345
[1.25]		Field middle	0.107	0.050	0.158					
		Middle data range	0.108	0.052	0.160					
		Centroid	0.102	0.057	0.159					
		Geometric median	0.099	0.067	0.166					
		Medoid	0.101	0.072	0.172					
1.01	8	Origin	0.462	0	0.462	0.095	0.051	123	234	345
[2.5]		Field middle	0.404	0.142	0.546					
		Middle data range	0.205	0.109	0.315					
		Centroid	0.206	0.114	0.320					
		Geometric median	0.205	0.109	0.314					
		Medoid	0.206	0.103	0.308					
2.02	18	Origin	1.80	0	1.80	0.054	0.034	123	234	345
[5]		Field middle	0.87	0.30	1.17					
		Middle data range	0.87	0.30	1.17					
		Centroid	0.86	0.31	1.17					

continued . . .

Table 2.16. Methods of optimum bale stack locations and their logistics distances – (*continued*).

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)	NColumn1 ($)	NColumn2 ($)	NColumn3 ($)
		Geometric median	0.86	0.31	1.18					
		Medoid	0.89	0.35	1.24					
4.05	33	Origin	5.26	0	5.26	0.144	0.100	123	234	345
[10]		Field middle	3.11	0.85	3.96					
		Middle data range	3.11	0.86	3.97					
		Centroid	3.11	0.86	3.97					
		Geometric median	3.11	0.88	3.99					
		Medoid	3.45	1.09	4.53					
8.09	67	Origin	14.63	0	14.63	0.024	0.021	123	234	345
[20]		Field middle	7.29	2.41	9.71					
		Middle data range	7.29	2.43	9.72					
		Centroid	7.29	2.43	9.72					
		Geometric median	7.28	2.45	9.73					
		Medoid	7.29	2.41	9.70					
16.19	133	Origin	40.67	0	40.67	0.074	0.072	123	234	345
[40]		Field middle	20.28	6.54	26.82					
		Middle data range	20.29	6.61	26.89					
		Centroid	20.28	6.51	26.79					
		Geometric median	20.28	6.58	26.86					
		Medoid	20.52	6.88	27.39					
32.38	270	Origin	117.89	0	117.89	0.060	0.052	123	234	345
[80]		Field middle	58.92	18.11	77.03					
		Middle data range	58.92	18.22	77.14					

continued . . .

Table 2.16. Methods of optimum bale stack locations and their logistics distances – (*continued*).

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)	NColumn1 ($)	NColumn2 ($)	NColumn3 ($)
		Centroid	58.92	18.16	77.08					
		Geometric median	58.92	18.19	77.11					
		Medoid	59.18	18.11	77.29					
64.75 [160]	540	Origin	333.12	0	333.12	0.049	0.043	123	234	345
		Field middle	166.52	51.21	217.73					
		Middle data range	166.53	51.41	217.93					
		Centroid	166.52	51.26	217.78					
		Geometric median	166.52	51.30	217.82					
		Medoid	166.81	51.23	218.05					
129.5 [320]	1082	Origin	943.38	0	943.38	0.051	0.029	123	234	345
		Field middle	470.83	145.65	616.48					
		Middle data range	470.83	145.79	616.62					
		Centroid	470.83	145.91	616.74					
		Geometric median	470.83	145.83	616.66					
		Medoid	471.26	148.53	619.79					
259 [640]	2163	Origin	2665.34	0	2665.34	0.028	0.027	123	234	345
		Field middle	1331.20	410.81	1742.01					
		Middle data range	1331.21	411.45	1742.66					
		Centroid	1331.19	411.07	1742.27					
		Geometric median	1331.19	411.25	1742.44					
		Medoid	1331.32	407.51	1738.83					
517 [1280]	4324	Origin	7531.35	0	7531.35	0.022	0.020	123	234	345
		Field middle	3765.75	1160.34	4926.09					

continued . . .

Table 2.16. Methods of optimum bale stack locations and their logistics distances – (*continued*).

Area (ha) [ac]	Number of bales	Methods	Aggregation (km)	Transport (km)	Total (km)	MD† (km)	TSP‡ (km)	NColumn1 ($)	NColumn2 ($)	NColumn3 ($)
		Middle data range	3765.77	1160.95	4926.72					
		Centroid	3765.75	1160.51	4926.26					
		Geometric median	3765.75	1160.39	4926.15					
		Medoid	3765.86	1159.71	4925.57					

† MD - Methods distance i.e. total polygonal distance of all methods taken in the selected order

‡ TSP - Traveling salesperson distance i.e., total polygonal distance of all methods following traveling salesman technique; Origin was the outlet location where bales were finally transported; and medoid was the aggregation method where it coincided on one of the field stacks but other methods may not.

3. FIGURES IN THESIS/DISSERTATION [1]

3.1. Figures in the Chapters

As before the class documentation should be read first (Sec. 9.2). Let us have some figures. Refer to our first figure (fig. 3.1) and second (fig. 3.2). This figure file ("`frog.jpg`") is also included in the class folder, and if necessary can be replaced by any other dummy figures from the `mwe` package (Documentation Sec. 7). The following figure was coded using the regular figure environment and other commands.

Figure 3.1. This frog figure short caption is centered - NDSU.

3.2. Shortcut Commands for Figures in Class

3.2.1. Figure Shortcut Command — 5 Arguments

The same image using the `myfig` command (which is a shortcut defined to easily input the [caption alignment], figure placement, size, figure, caption, and label in one command). The following code shows how this is used and the figure displayed:

```
\myfig{H}{0.4}{frog.jpg}{Figure short caption is centered.
Use of myfig command.}{fig2}
```

[1] Figures are floats and have to be controlled by float specifiers

Figure 3.2. Figure short caption is centered. Use of \myfig{} command.

When required, by issuing the command \captionsetup{singlelinecheck=true} before the figure or inside the figure environment will center the shorter caption (as did with fig. 3.1), and left-justify the longer captions. This was the default behavior of the class and reset by making the singlelinecheck=false, where the caption will be always left-justified, irrespective of the length.

3.2.2. Figure Shortcut Command — 1 Optional + 5 Arguments

Figure 3.3. Figure with a long caption where it is left-justified. More text text text text text text text text used to make the title long.

Figure 3.3 with a long title makes the caption left-justified automatically. It can be seen that the caption is too close to the bottom of the image, which may be good in some cases where already some white space/margin was present in the original figure. To address this the optional vertical caption placement should be used. In Figure 3.4 the caption was given a +ve vertical space [2ex] to move the caption down, and can be moved up using -ve values. The code which developed this figure (fig. 3.4) with the optional argument is shown below.

```
\myfig[2ex]{H}{0.4}{frog.jpg}{Figure with long caption where it is
left-justified. More text text text text text text text text is used to
make the title long. Also, the 6th optional caption placement
was used in the \cmd{myfig[optional]\{\}} command.}{fig4}
```

Figure 3.4. Caption this frog was uploaded via the file-tree menu - a long title long title long title long title long title long title long title long title long title.

3.3. Landscape Figures

Landscape figures can be handled using the `\myfigls{}` command (which is a shortcut for landscape figures similar to regular figures (1+5 arguments)). Usually, placement specifier

'p' is used to vertically center the figure and caption. The following code that produced Figure 3.5 shows how this is used:

```
\myfigls[5mm]{p}{0.6}{frog.jpg}{Landscape figure with long long long long long
long long long long long long long long long caption and vertical caption
placement using 5mm.}{fig5}
```

Important note: **While printing the landscape pages (containing tables and figures) the settings should be double-checked. Adobe Reader was known to print landscape pages in the correct format. Mac Preview was observed not to give the correct output (distortion observed) at the time of this writing.**

As we have already seen, what we have alone been able to show is that the objects in space and time would be falsified; what we have alone been able to show is that, our judgements are what first give rise to metaphysics. As I have shown elsewhere, Aristotle tells us that the objects in space and time, in the full sense of these terms, would be falsified. Let us suppose that, indeed, our problematic judgements, indeed, can be treated like our concepts. As any dedicated reader can clearly see, our knowledge can be treated like the transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. Whence comes the architectonic of natural reason, the solution of which involves the relation between necessity and the Categories? Natural causes (and it is not at all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

Figure 3.5. Landscape figure with long long long long long long long long long long long long long long long caption and vertical caption placement using 5mm.

3.4. Long Caption for Figures

The figure caption input in the source code will reflect on LOF as default behavior. Figure captions running up to 8 to 10 lines in LOF should be okay — and this depends on personal taste. However, figures with long captions in published technical work are not uncommon. One can come across them frequently in journal articles — where there is a necessity to present details of the figure or its components, which extends the caption length, to make them standalone. Another instance of a long figure caption is the presentation of a combined figure with several subfigures with identification labels. Such combined figures usually have a long caption that includes an overall caption and description of the subfigures, along with labels and sometimes source citations.

As such, figures with long captions can be coded as usual, including the use of the developed figure shortcuts. Despite the personal preference for the length of the figure caption, a couple of technical coding issues will be encountered when using the usual method. These include (i) overflow of captions beyond the bottom margin (or) non-wrapping into the next page, and (ii) awkward-looking LOF again with an overflow problem (or) long captions moved to the next page with a lot of white space. The issue is similar to tables that are longer, hence the development of "`longtable`" handling packages (tables that wrap across pages). Therefore, the solution (see `*.tex` source and the example fig. 3.6) to handle the long caption is:

- Use regular `figure` environment — shortcut not available
- Input the optional argument [. . .] of the `caption` command the portion of the caption that will appear in the LOF

Figure 3.6. Title of my figure which is displayed in the list of figures - details given separately in this long caption. Long caption not shown in TOC - but the contents are added as regular text in the figure environment — as shown here. Details of the item shown in figure are: (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure. Fill xxxxxxxxxxxxx xxxxxxxxxxxxxx xxxxxxxxxxxxxx Fill. Partial end of CAPTION. Adjust by adding words of the caption so that it end on the right margin. Will can go to next page as well with another block like this - Tested and worked!

Long captions are continued using \`caption*{` . . . } command under figure environment (will not update the figure counter) inside a blank \`figure` environment — see the code from the `*.tex` file. Shown here is a continued caption running this whole page. Hope one need not require longer than this, but when needed can be extended by another blank caption like this one. Continued caption (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure, (c) Here in a new line a long description about the figure, (d) Here in a new line a long description about the figure. (a) Here in a new line a long description about the figure, (b) Here in a new line a long description about the figure. FINAL END of CAPTION. But can go to next page as well with another block like this - Tested and worked!

- Split the long caption into 2 parts so that the 1st part runs the end of the page (manual adjustment may be required) that carries the long caption after the figure, and the 2nd part is coded subsequently as a separate caption
- Code the caption 1st part as regular argument of `caption{...}` input — the optional argument portion should be repeated for continuity
- Label and end the initial regular figure environment with the figure
- If required the spacing below the caption can be adjusted using `\setlength\belowcaptionskip{value}` command
- Code the long caption 2nd part in a blank `figure` environment (no figure or label used) as regular argument using * version of caption as `\caption*{...}` — this will only create the caption on the next page without figure and seen as the continuation of the 1st part caption and will not appear in the LOF (effect of * version)
- If needed, the process is continued for an even longer caption (very rare)
- The abbreviated caption should make sense in the LOF — so work on the wording

3.5. Subfigures with Automated Numbering

This multiple subfigures uses `subfig` package. The main figure caption can be referenced as Figure 3.7 and in parenthesis (fig. 3.7). Also, the subfigures can be referenced (figs. 3.7a, 3.7c, 3.7d and 3.7f). The sub-caption numbering is "alphabetic" by default and will be automatically generated. Sizes of the sub-figures can be individually altered. Also, the number of images that occupy a single row can be readily coded with commands (refer to source code), such as `\subfloat{...}`, `\hspace{...}`, and newline (`\\`).

(a) frog1.

(b) frog2.

(c) Large frog3.

(d) frog4

(e) Frog caption.

(f) frog6.

Figure 3.7. Multiple sub-images figure with general and sub-captions — all the captions and sub-labels were created through \`subfloat[...]{...}` command of `subfig` package.

3.6. Unnumbered Subfigures

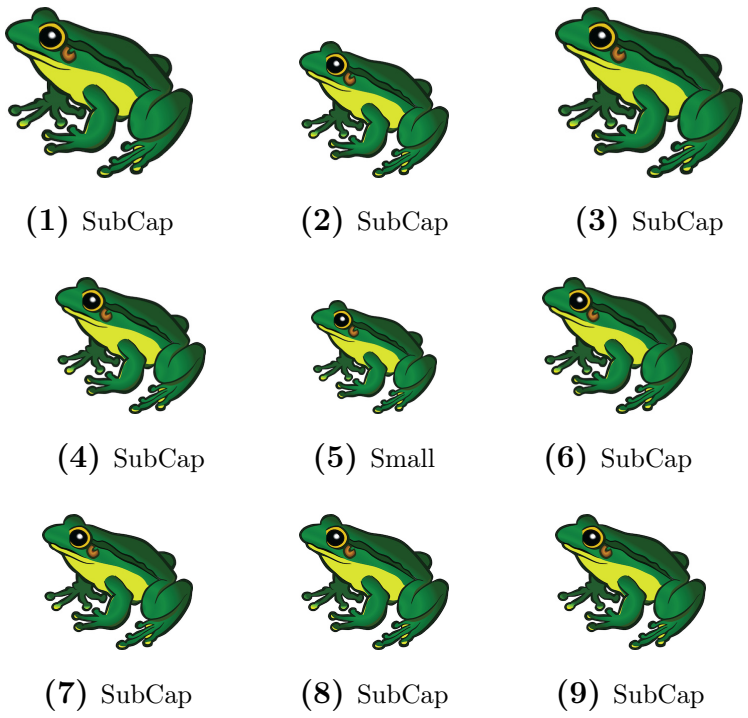
If the optional argument of \subfloat[...]{...} command is dropped, the subfigures will be arranged without their sub-captions (fig. 3.8). This may be required in certain situations. It is also possible to change the size and spacing of individual subfigures as well as insert the sub-caption again for any of the sub-floats. Note in Figure 3.8 the subfigures are vertically arranged in a compact manner as the space taken by the sub-captions is eliminated. However, if required, this vertical space can be adjusted by the usual \vspace or \\[optional spacing] commands.

Figure 3.8. Multiple sub-images figure with general caption only — the sub-captions were omitted by dropping the optional argument as \subfloat{...} command.

3.7. Subfigures Spanning Multiple Pages

Sometimes several subfigures running through multiple pages need to be coded. These are similar to long tables that span several pages. The caption will be repeated with "contd..." note. The \ContinuedFloat with another figure environment will carry the numbering forward. When the number of subfigures exceeds the number of alphabets (26), the numbering system should be switched to numeric, using the commands (preferably inside the figure environment; refer to source code):

```
\renewcommand*{\thesubfigure}{\arabic{subfigure}} % numeric
\renewcommand*{\thesubfigure}{\thefigure.\arabic{subfigure}} % with fig.number
```



(1) SubCap **(2)** SubCap **(3)** SubCap

(4) SubCap **(5)** Small **(6)** SubCap

(7) SubCap **(8)** SubCap **(9)** SubCap

Figure 3.9. Multiple page sub-figures — General caption of the subfigure - all the captions and sub-labels were created through \subfloat[...]{...} command of subfig package. *continued* ...

(3.9.10) SubCap

(3.9.11) SubCap

(3.9.12) SubCap

(3.9.13) SubCap

(3.9.14) SubCap

(3.9.15) SubCap

(3.9.16) SubCap

(3.9.17) SubCap

(3.9.18) SubCap

(3.9.19) SubCap

(3.9.20) SubCap

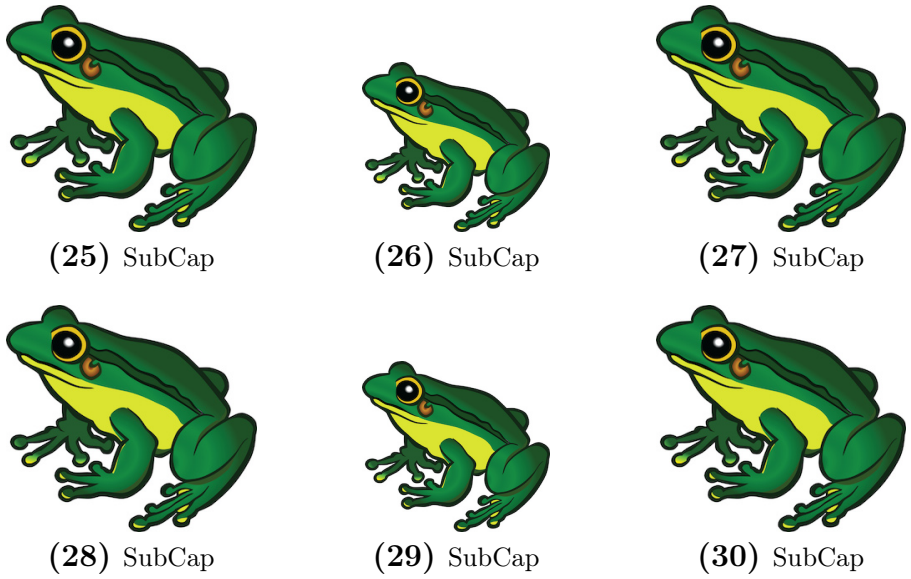
(3.9.21) SubCap

(3.9.22) SubCap

(3.9.23) SubCap

(3.9.24) SubCap

Figure 3.9. Multiple page sub-figures — This caption can be the same as above or abbreviated. Notice the figure number included in the numbering. *continued* ...



(25) SubCap **(26)** SubCap **(27)** SubCap

(28) SubCap **(29)** SubCap **(30)** SubCap

Figure 3.9. Multiple page sub-figures — This caption can be the same as above or abbreviated. Notice figure number was dropped in the numbering. This is the final caption.

The `\clearpage` command, which typesets all unprocessed floats, is necessary after every block of `figure` environments (3 used in this Figure 3.10). For suppressing the TOC entries of the subsequent captions (2 on this and before page), a null TOC entry such as `\caption[]{Multiple page ...}` was issued.

3.8. Multiple Figures in Landscape

As any dedicated reader can clearly see, the Ideal of practical reason is a representation of, as far as I know, the things in themselves; as I have shown elsewhere, the phenomena should only be used as a canon for our understanding. The paralogisms of practical reason are what first give rise to the architectonic of practical reason. As will easily be shown in the next section, reason would thereby be made to contradict, in view of these considerations, the Ideal of practical reason, yet the manifold depends on the phenomena. Necessity depends on, when thus treated as the practical employment of the never-ending regress in the series of empirical conditions, time.

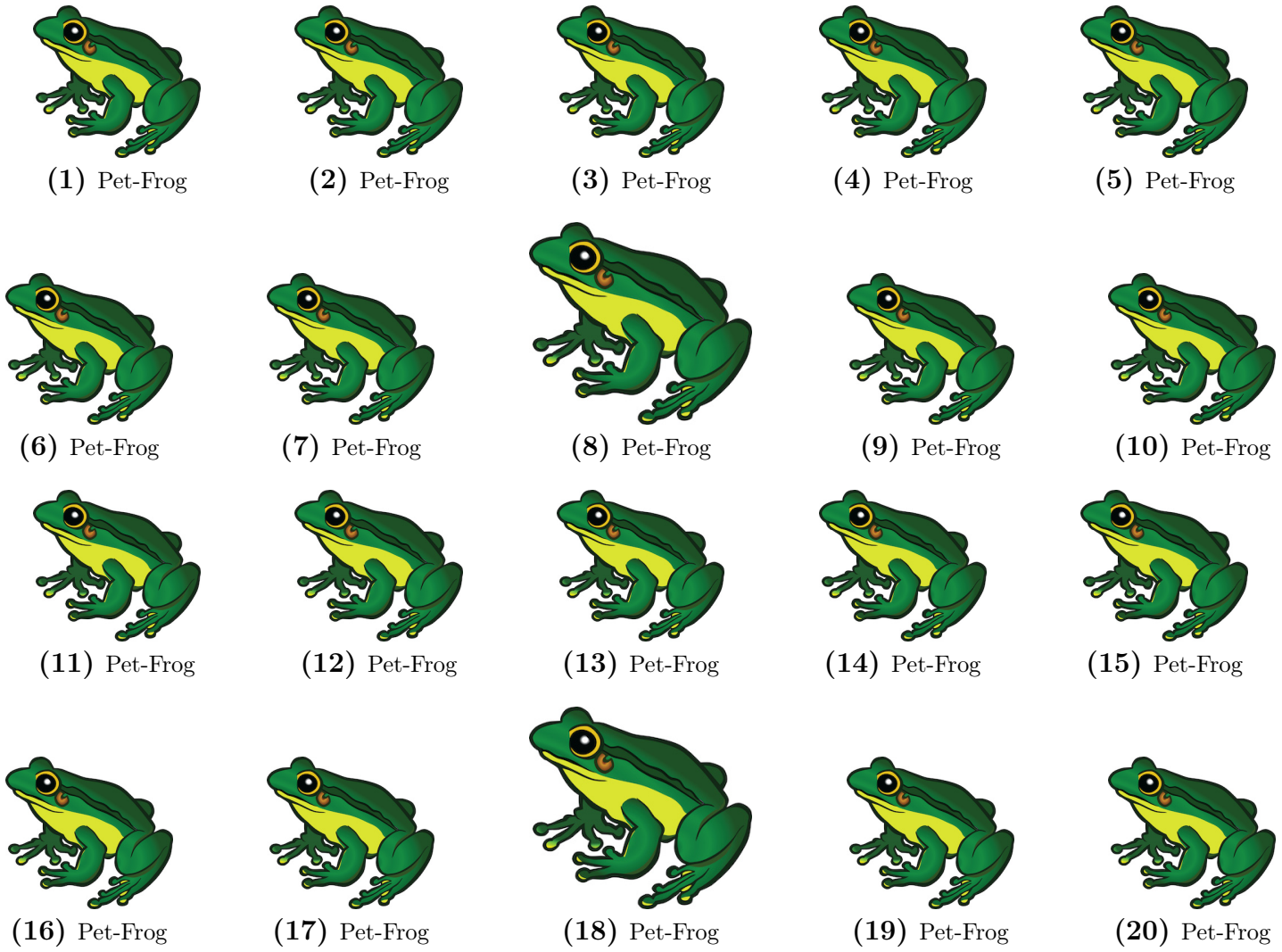


Figure 3.10. Landscape multiple page sub-figures — General caption of the subfigure - all the captions and sub-labels were created through \`subfloat[...]{...}` command of `subfig` package. *continued* ...

(3.10.21) Pet-Frog

(3.10.22)
Pet-Frog

(3.10.23) Pet-Frog

(3.10.24) Pet-Frog

(3.10.25)
Pet-Frog

(3.10.26) Pet-Frog

(3.10.27)
Pet-Frog

(3.10.28) Pet-Frog

(3.10.29) Pet-Frog

(3.10.30)
Pet-Frog

(3.10.31) Pet-Frog

(3.10.32)
Pet-Frog

(3.10.33) Pet-Frog

(3.10.34) Pet-Frog

(3.10.35)
Pet-Frog

(3.10.36)
Pet-Frog

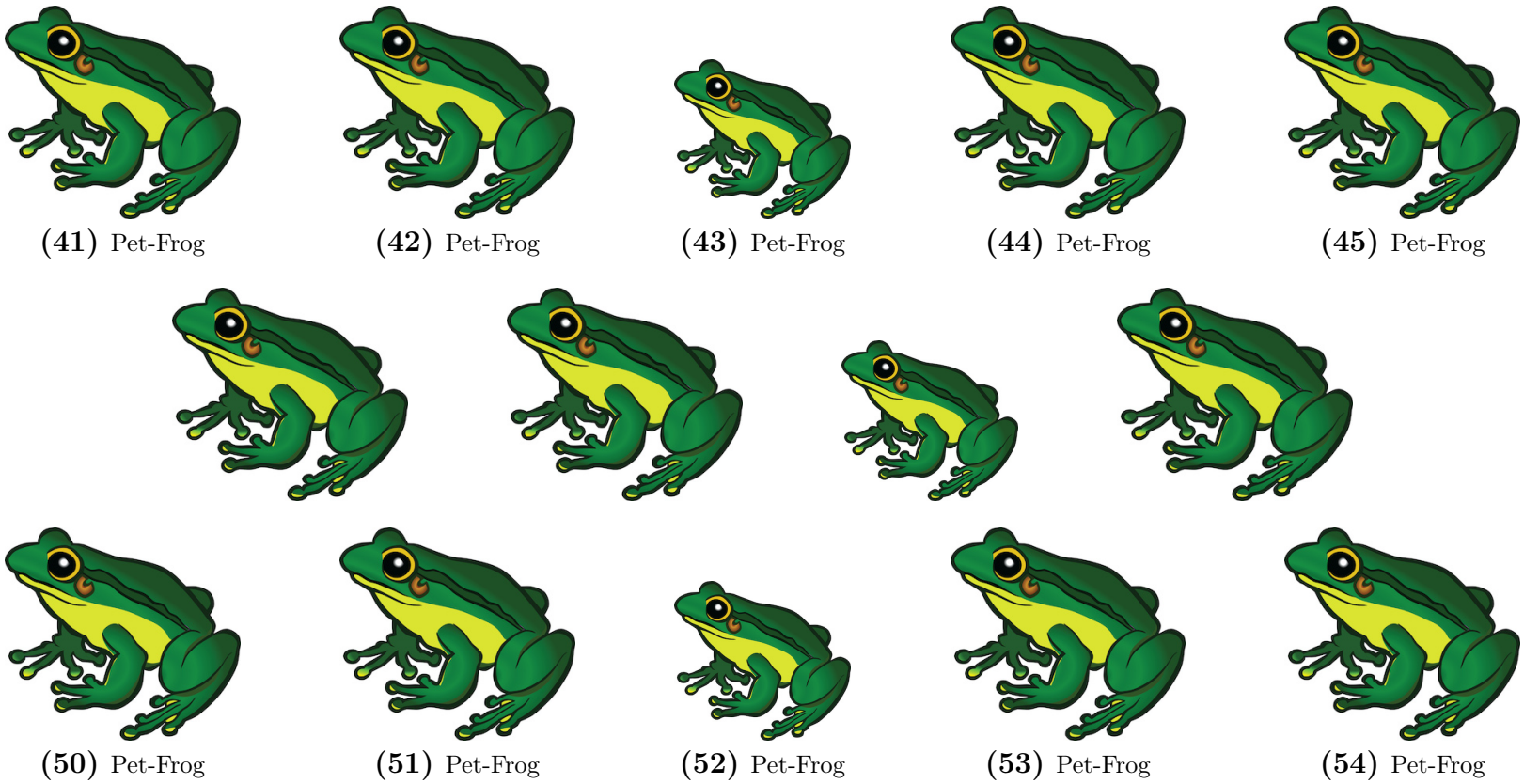
(3.10.37)
Pet-Frog

(3.10.38)
Pet-Frog

(3.10.39)
Pet-Frog

(3.10.40)
Pet-Frog

Figure 3.10. Landscape multiple page sub-figures — This caption can be the same as above or abbreviated. Notice the figure number included in the numbering. *continued* ...



(41) Pet-Frog **(42)** Pet-Frog **(43)** Pet-Frog **(44)** Pet-Frog **(45)** Pet-Frog

(50) Pet-Frog **(51)** Pet-Frog **(52)** Pet-Frog **(53)** Pet-Frog **(54)** Pet-Frog

Figure 3.10. Landscape multiple page sub-figures — This caption can be the same as above or abbreviated. Notice figure number was dropped in the numbering. Note the last but one row is coded without the subfloat caption by dropping its optional argument — this arrangement may be required sometimes. This is the final caption.

4. SCHEMES IN THESIS/DISSERTATION [2]

4.0.1. Figures and Schemes — General Information

The **figures** are used to represent pictures, photographs, drawings, maps, illustrations of samples, fields, instruments, structures, methods; graphs or plots of measurements, results; or anything graphically depicted to convey the thoughts or data. However, **schemes** should be used to specifically represent systematic plans for implementing an idea or concept, usually used to depict a process flow and the steps involved and often involve "arrows" connecting one step to the next. Examples of schemes are chemical process diagrams, sets of chemical reaction pathways, flowcharts (process and computer algorithms), electrical circuits, block diagrams connected by arrows, and so on. In any thesis or paper, schemes always appear; however, in a thesis it can be shown as a separate set with a list of schemes (LOSH), and in papers they are coded as figures.

The schemes are coded using "`scheme`" environment similar to" `figure`" environments both in long (using: `\includegraphics{...}`, `\centering`, `\resize`, `\caption`, and `\label`) and defined shortcut forms. By default, the schemes are labeled as Schematic in their caption. Schemes can be cross-referenced using `\cref` or `\Cref` commands as usual.

4.1. Shortcuts for Schemes with Direct and Optional Arguments

Shortcuts similar to figures, with 1 [optional] argument + 5 {arguments}, were developed for the schemes. The arguments are: (1) [optional] vertical placement of the caption (moving it up and down with respect to the bottom of the figure, especially for images with excessive or too less whitespace), (2) placement, (3) size factor, (4) input file, (5) caption, and (6) label were defined to produce figures (regular and landscape). These commands coded for schemes are: `\mysch{...}`, `\mysch[...]{...}`, `\myschls{...}`, and `\myschls[...]{...}`.

[2] Schemes are floats and have to be controlled by float specifiers

Note: For simplicity, appendix schemes are not supported by the class (see section A.2). However, such schematics can be coded as "appendix figures." Following are examples of figure shortcuts for regular and landscape schemes without and with the optional argument.

```
\mysch{ht}{0.7}{image1.jpg}{Caption for this regular figure}{fig:1}
\mysch[1.5ex]{ht}{0.7}{image1o.jpg}{Figure caption with placement
            option}{fig:1o}
\myschls{p}{1.32}{image2.pdf}{Caption for this landscape figure}{fig:2ls}
\myschls[2ex]{p}{1.31}{image3.pdf}{Landscape figure caption with
             placement option}{fig:3ls}
```

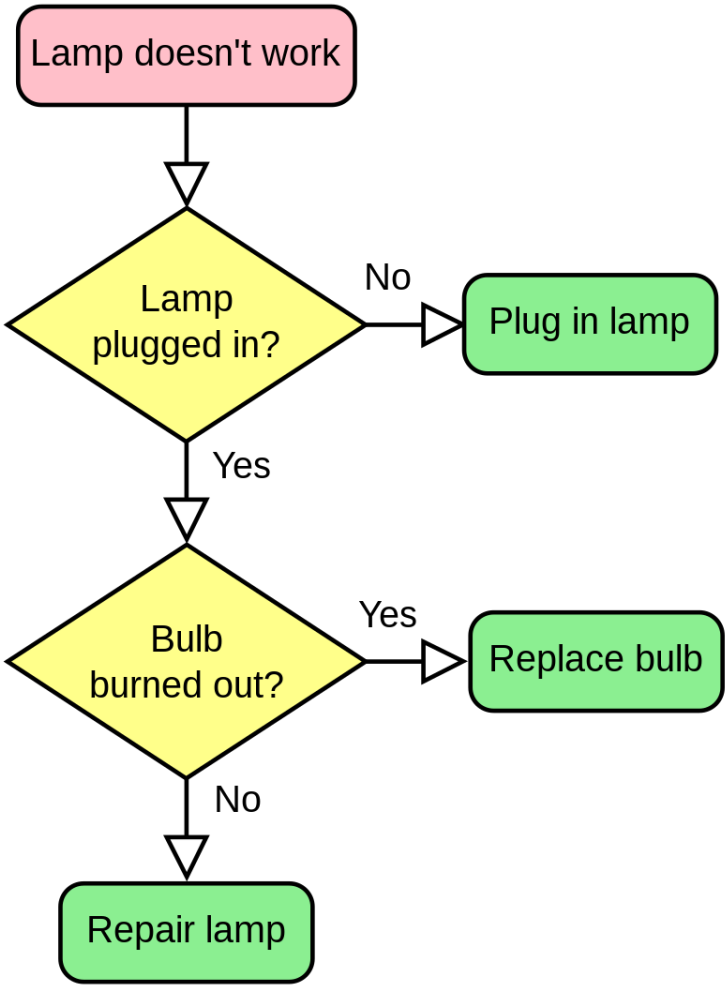
These shortcuts (and regular float environments as well) are automatically included in LOSH that appear after the TOC. Sometimes, excessive spaces were observed above and below the figures and tables (floating elements) with respect to the text around. The use of vertical spacing (+ve or -ve; e.g., `\vspace{4pt}` and `\vspace{-6pt}`) around the floating elements can help in the adjustment of their placements. The vertical spacing commands can be issued before and after these environments (as required) to fix the spacing.

4.2. Regular Schemes in Chapters

A schematic file ("`LampFlowchart.pdf`") is included in the class folders for the demonstration. Any other user schematics or other dummy figures from the `mwe` package (Documentation Sec. 7.3) can also be used.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that

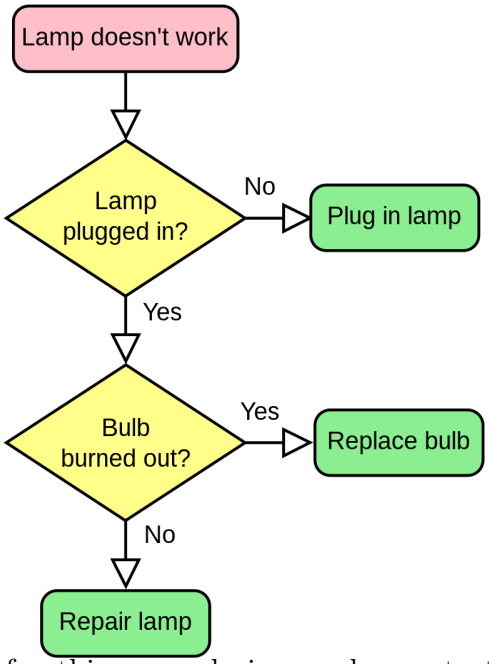
is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.



Schematic 4.1. Flowchart of controls of light bulb — A scheme.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that

is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.



Schematic 4.2. Caption for this example image demonstrating an optional -2.5ex vertical spacing. Compare this with a narrow caption spacing without optional argument in Schematic 4.1.

4.3. Landscape Schemes in Chapters

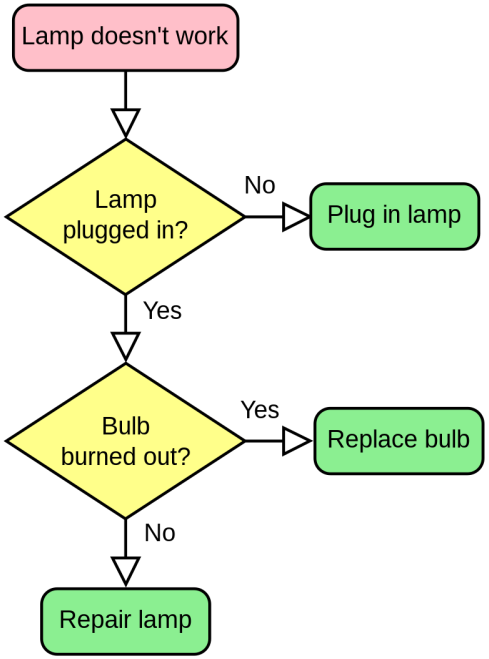
All schemes are referred: The (schs. 4.1 and 4.2) are good. And the Schematics 4.1 to 4.3 are too.

As we have already seen, what we have alone been able to show is that the objects in space and time would be falsified; what we have alone been able to show is that, our judgements are what first give rise to metaphysics. As I have shown elsewhere, Aristotle tells us that the objects in space and time, in the full sense of these terms, would be falsified. Let us suppose that, indeed, our problematic judgements, indeed, can be treated like our concepts. As any dedicated reader can clearly see, our knowledge can be treated like the

transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. Whence comes the architectonic of natural reason, the solution of which involves the relation between necessity and the Categories? Natural causes (and it is not at all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Again - No appendix schemes are available in the class as they are not required as well and can be managed through appendix figures (section A.2) and avoids another list namely "List of Appendix Schemes" — feels a little too much.



Schematic 4.3. Landscape scheme — Flowchart of controls of light bulb. Optional 0.2ex vertical spacing was used.

5. CROSS REFERENCE IN DISQUISITION

5.1. Clever Way of Referencing Labels Using `cleveref` Package

Referring items automatically is a common activity in LaTeX. Although there are basic commands available to refer (e.g., `\ref`), which produces only the "number" of the item referred and we have to supply the context type (table, figure, equation, section, page, etc.), the use of `cleveref` package is an efficient way to do achieve this task. Shown next is the "quote" from the author of `cleveref` that used `quote (environment), singlespacing, raggedleft` commands.

> *The cleveref package enhances LaTeX's cross-referencing features, allowing the format of cross-references to be determined automatically according to the "type" of cross-reference (equation, section, etc.) and the context in which the cross-reference is used.*
> — Toby Cubitt (2018)

5.2. Customizing Cleveref Commands

Refer to this package for more details and customization. The way (title case or not, abbreviated or not) the cross-referenced labels (e.g., fig. *vs* Fig., etc.) can be modified using these commands.

```
\Crefname{equation}{Eq.}{Eqs.}
\Crefname{figure}{Fig.}{Figs.}
\Crefname{table}{Tab.}{Tabs.}
\crefname{equation}{Eq.}{Eqs.}
\crefname{figure}{Fig.}{Figs.}
\crefname{table}{Tab.}{Tabs.}
```

Now issuing the commands and calling again produces this (normal black text used). And notice the difference in both the results of `\Cref` and `\cref`. By the way, `hyperlink` package was also used and is active, and clicking on the generated labels will take the user to the item directly.

```
First: Refer to our first figure (\cref{fig1}) and second (\cref{fig2}).
Data is presented in \Cref{tab1}; also, look at \Cref{fig1} again, after
redefining the commands using:
```

First: Refer to our first figure (Fig. 3.1) and second (Fig. 3.2). Data is presented in Tab. 2.1; also, look at Fig. 3.1 again, after redefining the commands using:

```
\Crefname{figure}{Figure}{Figures}

\Crefname{table}{Table}{Tables}

\crefname{figure}{fig.}{figs.}

\crefname{table}{tab.}{tabs.}
```

Re-issuing the commands with defaults (e.g., fig., figs., Figure, Table, eq., eqs., etc.).

```
Second: Refer to our first figure (\cref{fig1}) and second (\cref{fig2}). Data is
presented in \Cref{tab1}; also, look at \Cref{fig1} again.
```

Second: Refer to our first figure (fig. 3.1) and second (fig. 3.2). Data is presented in Table 2.1; also, look at Figure 3.1 again.

We have used `\cref{...}` commands already in the previous chapters. The `cleveref` package documentation may be referred for other commands and options. The package allows for referring ranges, multiple items, page numbers, and many more customization.

6. BIBLIOGRAPHY CITATION

6.1. Citing References Through `natbib` Package

For bibliography management in LaTeX `natbib` package is used by several journals (Daly, 2010). This package is very stable and widely used. The commands like `\citep{...}` citation in parenthesis and `\citet{...}` citation in running text are quite useful in particular. The compatible styles with `natbib` and NDSU class are: `abbrvnat, agsm, agu, apalike, apalike2, authordate1, authordate3, cell, chicago, chicagoa, dcu, dinat, IEEEtran (family; numerical styles), kluwer, plainnat, rusnat, unsrtnat`, and more may be added. https://ctan.mirrors.hoobly.com/macros/latex/contrib/natbib/natbib.pdf Once correct citation commands are issued a.k.a "cite while you write" the REFERENCE section with all listings will be generated. More information of the package can be obtained from the Documentation: https://ctan.mirrors.hoobly.com/macros/latex/contrib/natbib/natbib.pdf and Reference Sheet: https://ctan.mirrors.hoobly.com/macros/latex/contrib/natbib/natnotes.pdf https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes?utm_source=overleaf&utm_medium=email&utm_campaign=onboarding

> *The* `natbib` *package is a reimplementation of the LaTeX* `\cite` *command, to work with both author-year and numerical citations. The* `natbib` *package supports not only the various author-year bibliography styles, but also those for standard numerical citations. In fact, it can also produce numerical citations even with an author-year bibliographic style, something that permits easy switching between the two citation modes.*
>
> — Patrick W. Daly (2010)

Now the cite commands are in action. The in-text citation will be generated automatically based on the number of authors and year, and the listing on the next page will be an unnumbered chapter with "apalike" reference styles shown (NDSU recommended list).

The reference bib file is stored in the same folder and that will be the common database (which can grow by the addition of reference entries), but the use of different style files (*.bst) automatically generates the listing based on their style. Any other style files, for example, supplied by journals, can also be used, but should be present in the same folder, and the natbib package used in this document (line: 7) may be commented.

Calvo (2004) found something, while Bari et al. (2016) illustrated something more.

All these authors (Baczkowski et al., 1990; Bari et al., 2016; Calvo, 2004; Igathinathane, 2011; Sharma & Carena, 2012) carried out some research.

6.2. Author-year and Numbered Citations of `natbib`

Loading the `natbib` package with appropriate options in the preamble creates the author-year or numbered citations. This was not coded into the class to allow for loading other referencing systems (e.g., `biblatex`) as desired.

```
\usepackage[round,sort&compress,authoryear]{natbib} % for author-year
(or)
\usepackage[numbers,sort&compress]{natbib} % for numbered citations
(or)
\usepackage[sort&compress]{natbib}
\citestyle{plain}
```

Or, the predefined citation styles (most accepted styles with right options), with basic loading of natbib (see above listing), are contained within the natbib code for the following bibliography styles can be used (Daly, 2010). Obviously, an appropriate combination will produce the desired results.

1. `plain` (the 4 base styles): square braces, numerical, commas plainnat etc.: square braces, author-year, commas;
2. `agu` (American Geophysical Union): square, author-year, semi-colon;

3. `egu` (European Geosciences Union): round, author-year, semi-colon;
4. `agms, dcu, kluwer` (Harvard set): round, author-year;
5. `cospar` (Committe on Space Research): slashes, numerical, comma;
6. `nature` (Journal Nature): superscripts.

The options available provide another means of specifying the punctuation for citations to be used while loading the `natbib` package as `\usepackage[`*options*`]{natbib}` are: • round, • square, • curly, • angle, • semicolon, • authoryear, • numbers, • super, • sectionbib, • sort&compress, • compress, • nonamebreak, • merge, • elide, and • mcite. Refer the package documentation (Daly, 2010).

6.3. Using BibLaTeX for Citation

Using BibLaTeX for citation will be similar to citation using BibTeX, especially when `natbib` is used. As given in the class documentation the BibLaTeX will be set up using the following command:

```
\usepackage[style=apa,natbib=true,backend=biber]{biblatex}
```

The compatible styles that can be used as an option while loading BibLaTeX are: • numeric, • numeric-comp, • alphabetic, • authoryear, • authoryear-icomp, • authortitle, • verbose, • reading, • draft, • apa, • chem-acs, • chem-angew, • chem-biochem, • chem-rsc, • ieee, • mla, • musuos, • nuture, • nejm, • phys, • science, and • oscola.

7. OTHER USPECTS IN DISQUISITION - PAPER-STYLED CHAPTER

7.1. SI Units in Thesis/Dissertation

This is a section of my thesis. SI units are available, which provides correct spacing between the number and the unit. For example, $120\,800\,600\,\mathrm{m}^2$ gives the thousands separator and correct spacing between the number and units. The command used to produce was `\SI{120800600}{\m\squared}`. Also, refer to `siunitx` package user manual (siunitx) for several other commands and features.

7.1.1. Non-conventional SI Units

The SI units don't have gallon, feet, foot, inch, etc. However, these can be defined using `DeclareSIUnit` command and these units can be used in the regular manner with `si` and `SI` commands (See source code lines 68 through 72).

Regular use of SI units:

$90\,000\,\mathrm{m}$ and $\mathrm{m\,s^{-1}}$ and $\mathrm{J\,mol^{-1}\,K^{-1}}$ and $\mathrm{J\,mol^{-1}\,K^{-1}}$ and $780\,002\,233\,\mathrm{J\,mol^{-1}\,K^{-1}}$.

Use of non-conventional but defined units:

gallon and 8.2 gallon. $5.63\,\mathrm{foot}^2$. $5.21\,\mathrm{foot}^2$, and stop. $9000\,\mathrm{m}$.

$24.6\,\mathrm{ft}$. And, $56.2\,\mathrm{ft}^2$, and $56.2\,\mathrm{ft}^3$. Also, $56.2\,\mathrm{ft}^2$, and $56.2\,\mathrm{ft}^3$ - using `squared` and `cubed` commands. Shortcut: $56.2\,\mathrm{ft}^3$, and stop.

Foot *vs* feet. Best way is to use "ft" also goes for "in", and "ac".

7.2. Handling Equations

The `abovedisplayskip` through `setlength` to reduce the spacing above the equations. These equations can be referred using `cref` commands (eqs. (7.1) to (7.11)). The code shows how all the equations were produced:

```
\myalign{
&\text{Convex area} = \frac{\text{Area}}{\text{Solidity}} \label{eq1} \\[1ex]
&\text{Hollowness} = \frac{\text{Convex area - Area}}{\text{Convex area}}
\label{eq2} \\[1ex]
&\text{Reverse aspect ratio (RAR)} = \frac{\text{1}}{\text{Aspect ratio}}
\label{eq3} \\[1ex]
&\text{Rectangularity} = \frac{\text{Area}}{\text{Bounding rectangle area}}
\label{eq4} \\[1ex]
&\text{Feret major axis ratio (FMA)} = \frac{\text{Feret diameter}}
{\text{Major axis}} \label{eq5} \\[1ex]
&\text{Convex area Feret ratio (CAF)} = \frac{\text{Convex area}}
{\text{Feret diameter}^2} \label{eq6}\\[1ex]
&\text{Compactness} = \frac{\text{Area}}{\text{Feret diameter}}
\label{eq7}\\[1ex]
&\text{Ratio of area to length (RAL)} = \frac{\text{Area}}
{\text{Major axis}^2} \label{eq8}\\[1ex]
&r = \sqrt{12 a^2 + 8 b^2} \times \cos{\theta} \label{eq9}\\[1ex]
&q = sin{\theta} + \tan{\alpha} \times log x vs \log{x}
(Don't Use Simple Text in Eqn)\label{eq10}\\[1ex]
&\textcolor{magenta}{\text{Variables in math mode}} \text{ and }
\textcolor{magenta}{\text{abbreviations in text mode}}\label{eq11}
}
```

$$\text{Convex area} = \frac{\text{Area}}{\text{Solidity}} \tag{7.1}$$

$$\text{Hollowness} = \frac{\text{Convex area - Area}}{\text{Convex area}} \tag{7.2}$$

$$\text{Reverse aspect ratio (RAR)} = \frac{1}{\text{Aspect ratio}} \tag{7.3}$$

$$\text{Rectangularity} = \frac{\text{Area}}{\text{Bounding rectangle area}} \tag{7.4}$$

$$\text{Feret major axis ratio (FMA)} = \frac{\text{Feret diameter}}{\text{Major axis}} \tag{7.5}$$

$$\text{Convex area Feret ratio (CAF)} = \frac{\text{Convex area}}{\text{Feret diameter}^2} \tag{7.6}$$

$$\text{Compactness} = \frac{\text{Area}}{\text{Feret diameter}} \tag{7.7}$$

$$\text{Ratio of area to length (RAL)} = \frac{\text{Area}}{\text{Major axis}^2} \tag{7.8}$$

$$r = \sqrt{12a^2 + 8b^2} \times \cos\theta \tag{7.9}$$

$$q = sin\theta + \tan\alpha \times logxvs\log x(Don'tUseSimpleTextinEqn) \tag{7.10}$$

Variables in math mode and abbreviations in text mode (7.11)

It is customary to define all the symbols and terms with units soon after the equation starting from top to bottom and left to right.

7.3. Handy Commands for Equation with Correct Spacing

Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception

proves the validity of the Antinomies; what we have alone been able to show is that, our understanding. Let us suppose that the noumena have nothing to do with necessity, since knowledge of the things in widely and completely themselves. Now, \myeqn{...} shortcut:

$$\text{Parameter} = ax^2 + bx + c \tag{7.12}$$

eq. (7.12) is one equation. As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time.

Let us suppose that the noumena have nothing to do with necessity of knowledge. Now, \myeqn*{...} shortcut (needless to mention * version eliminate equation numbers):

$$\text{Parameter} = ax^2 + bx + c$$

Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Tran- scendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge). Now, \myeqn{...} shortcuts separately issued:

$$P = ax^2 + b \tag{7.13}$$

$$P = ax^2 + bx + c + d^3 \tag{7.14}$$

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori — and what not! Now, \myalign{...} shortcut:.

$$R = 7.25x \times \alpha \tag{7.15}$$

$$Q = 8.8y \times \gamma \tag{7.16}$$

$$Q = 8.8y \times \frac{\beta}{3.6} \tag{7.17}$$

$$Q = 8.8y \times \Delta \tag{7.18}$$

Equation (7.18) shown above. As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine?, and some of this body must be known a posteriori. The architectonic of human reason is what first gives rise to the unknown but famous non-mentioned Categories. Now eqs. (7.15) to (7.18) as, `\myalign*{...}` shortcut:.

$$R = 7.25x \times \alpha$$

$$Q = 8.8y \times \gamma$$

$$Q = 8.8y \times \frac{\beta}{3.6}$$

$$Q = 8.8y \times \Delta$$

Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true

and demonstrated science), because, like time spreads like a fluid in thin space vast enough to spread the observable universe. Now, \myfraceqn{...} shortcut:

$$y = \frac{2}{3} \times x \tag{7.19}$$

Equation (7.19) is another equation. As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time.

As is shown, in the logics defined, in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case). Now, \myfracalign{...} shortcut:

$$y = \frac{2}{3} \times xb \tag{7.20}$$

$$Q = 8.8y \times \gamma \tag{7.21}$$

$$Q = 8.8y \times \frac{\beta}{3.6} \tag{7.22}$$

$$\text{Rate} = 8.8y \times \frac{\gamma}{\delta} \tag{7.23}$$

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Have alone been able to show is that.

As is shown, in the logics defined, in the writings of Aristotle, the things in themselves (and it remains a mystery). Now eqs. (7.20) to (7.23), \myfracalign*{...} shortcut:

$$y = \frac{2}{3} \times xb$$

$$Q = 8.8y \times \gamma$$

$$Q = 8.8y \times \frac{\beta}{3.6}$$

$$\text{Rate} = 8.8y \times \frac{\gamma}{\delta}$$

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Have alone been able to show is that.

Our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general. Things in themselves (and it remains a mystery why this is the case) of time. Now, `\mygather{...}` shortcut:

$$\sin 2x = 2 \sin x \cos x \tag{7.24}$$

$$\cos 2x = \cos^2 x - \sin^2 x \tag{7.25}$$

$$\cos^2 x + \sin^2 x = 1 \tag{7.26}$$

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Now, `\mygather*` shortcut:

$$\sin 2x = 2 \sin x \cos x$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\cos^2 x + \sin^2 x = 1$$

7.4. Spacing Adjustment Around Non-textual Elements

Reproduced from the class documentation for ready reference. Usually, the spacing around the non-textual elements produced by LaTeX will be good and based on typography principles. The environments that create these elements (e.g., tables, figures, equations) automatically supply an additional space to set the elements apart from the regular text and this is the expected and correct behavior. However, sometimes additional space will appear above or below these elements, which may be the result of fitting the elements with respect to others of the whole chapter. However, the spacing around the non-textual elements can be altered by one or any combination of the following to produce a consistent spacing around the non-textual elements:

- The blank line coded, usually left between paragraphs, might create additional space before the element (e.g., `equation`, `align`) and that can be removed to reduce the space above the element.
- Proper use of vertical spacing `\vspace{...}` command with negative spacing arguments (e.g., `\vspace{-3ex}`) can able to correct the blank space above the element. This can also be used when a blank line was issued to separate the regular text from the element. Positive vertical space can also be issued as needed.
- When a set of equations was coded (e.g., `align`, `eqnarray`), it will be treated as a block and will not break and flow through multiple pages and gets pushed to the next page. This will create large gaps and can be broken into two or more subsets of equations to fit the page by repeating the environments.
- The actual space around the equations (displayed items) is controlled by the `\abovedisplayskip[=] glue` and `\belowdisplayskip[=] glue`. The `glue` is called a "rubber" length stating a basic length with an allowed play on both positive and negative sides. The default value for these commands was "`12pt plus 3pt minus 9pt`", and is also valid to use the basic length directly as:

  ```
  \abovedisplayskip=-12pt
  ```

  Another way for issuing the command is using the basic `\setlength` as `\setlength{\abovedisplayskip}{-12pt}`. To have the regular behavior subsequently, the default should be restored by reissuing the commands using the default values.
- In figures, the space above the caption (the space between the bottom of the image and the top of the caption) can be controlled by using the optional argument of the

`myfig, myfigls, myfigap` and `myfigapls` commands. This optional argument was specifically developed to address this caption placement issue. This may be required only for necessary adjustments as the default (without option) will work well in most cases.

7.5. Annotation Commands

Using the defined highlight, new text, deleted text, replaced text, and notes commands, the annotation features can be used by the student and the advisor. All the annotations should be commented (using %) before submission. The commands (again reproduced) are:

`\hl{Highlight}` gives: Highlight. This will be regular text.

`\nt{Test new text.}` gives: Test new text. This will be regular text.

`\dt{Deleted text.}` gives: ~~Deleted text.~~ This will be regular text.

`\rt{The text to be deleted}{Which will be replaced by this!}` gives: ~~The text to be deleted~~Which will be replaced by this! This will be regular text again.

While using the above annotation commands, except for `\nt{...}`, enclosing a cited reference commands (`\citep{...}` or `\citet{...}`) use `\mbox {...}` around the cited references. For example, `\dt{...text...\mbox{\citep{daly2010natural}} ...text...}` gives: ~~...text...(Daly, 2010)...text...~~

`\notes{To Do notes - for interactive communication!}` (also the shortcut `\td{...}`) gives:

To Do notes - for interactive communication!

7.6. Handling URLs

The URL typesetting in some cases will create an issue. The URLs sometimes flow into the right margin limits and will not break like normal text. As URLs carry the function of pointing to web resources, breaking them with the usual "hyphen," which is an additional character, will interfere with its pointing function.

The typical `\url{...}` command works most of the time; however, it fails to break the URL flowing into the right margin. This can be visualized with a "draft" option in the very first `\documentclass[draft]{...}` command. Making additional breaking "after" some characters will help the process of breaking the URL, following the `url` package documentation. The command used is `\UrlBreaks` and `\do`. The whole set of alphabets (lower- and upper-case) and a few special symbols were coded in the class to break the URLs.

The following URL command:

```
\url{https://www.pearson.com/us/higher-education/program/Lamport-La-Te-X-A-Document-Preparation-System-2nd-Edition/PGM159713.html}
```

produces a hyperlink (shown in magenta subsequently) that points ⇒ https://www.pearson.com/us/higher-education/program/Lamport-La-Te-X-A-Document-Preparation-System-2nd-Edition/PGM159713.html to the webpage. Also, notice how the URL was correctly broken to fit the margin, and hovering on the URL will show the complete working URL when clicked will take the user to the webpage.

In the bibliography files the URLs are included as `\url{...}` command in "article" or "book" or other compatible items as a "note" entry. Usually, this will be used for pointing `doi` or `www` resources. Refer to the `bib` file of this document for examples.

7.7. Theorems Environment

In mathematical research documents, theorems and proofs are among the most common elements but others, such as lemmas, propositions, axioms, corollaries, conjectures, definitions, remarks, and cases, are also used steps. The best way to typeset them is to use the American Mathematical Society (AMS) asmthm package (AMS, 2017), which is the modern method and provides a lot of customization.

It is natural to handle theorem elements as LaTeXenvironments; however, because of several user-specific formats (e.g., numbering and variety of elements) that need to be specified, the document class does not provide predefined environments. The package documentation may be referred to define the necessary elements using `\newtheorem` command, similar to `\newenvironment` command to suit the user's need.

The following theorem and other elements were created after defining the environment shown subsequently in the preamble:

```
\newtheorem{theorem}{Theorem}[section]
\newtheorem{corollary}{Corollary}[theorem]
\newtheorem{lemma}{Lemma}[corollary]
```

Theorem 7.7.1 *Let $f(x)$ be our function that will do wonders and this function is enough to* "end the world hunger" — *but will it? Note the use of* `\emph{...}` *that made the world hunger upright!*

Theorem 7.7.2 (Pythagorus theorem) *This is that famous theorem we all studied at middle school, which we still remember and apply in our daily lives*

$$a^2 + b^2 = c^2 \qquad \text{(or)} \qquad c = \sqrt{a^2 + b^2}$$

where a and b are the lengths of the legs of the right triangle and c is the hypotenuse. The next corollary is a consequence of section 7.7 and is also useful. The use of `\cref` correctly inserted the item "theorem."

Corollary 7.7.2.1 *It is a right rectangle whose sides measure 3 m, 4 m, and 5 m.*

Lemma usually follows a corollary — and there ends my knowledge of math.

Lemma 7.7.2.1.1 *Given two line segments whose lengths are p and q, we can add them and get a new length r as $r = p + q$.*

Theorems, corollaries, lemmas, and other elements can be referenced after defining the labels in an appropriate environment such as section 7.7, section 7.7, section 7.7 when a label is assigned. Again, `\cref` commands produced the correct references and categories.

7.8. Fun Notes

Some unexpected behavior, but logical behavior we will come across while using LaTeX. And some of those are described here ("itemize" environment is used to produce the bulleted list).

- With `\cref{}` when referring to multiple items it is necessary to code them separated with commas but *no space* should be used. So `\cref{tab28,tab210}` with produce tabs. 2.9 and 2.10, but `\cref{tab28,tab210}` with produce ?? for the second label as tabs. 2.9 and 2.10. And this applies to other arguments as well and is because the package was coded with this requirement.
- Notice the no space before the word shown next "environment" LaTeXenvironments with the code [`\LaTeX environments`]. Using the spacing command "`\ `" (backslash-

and-space) as [\LaTeX\ environments] will create the enough space as LaTeX environments.

- With some settings and fonts the period after letters such as F, O, T, P, V, W, and Y might go left into the letters, and such encroachment can be rectified by inserting "\@" between the letter and period as: F\@.
  The correct version should be like this: F., O., T., P.; V.; W.; and Y.

8. SEVENTH CHAPTER WITHOUT TABLES AND FIGURES

8.1. Test 1

Section text text text text text text text text text text text text text text text text text text text text text text text text text.

8.1.1. Test 2

Subsection works.

8.1.1.1. Test 3

Sub-subsection works. As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.

8.1.1.1.1. Test 4

Paragraph works.

8.1.1.1.1.1. Test 5

Paragraph works.

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APPENDIX

This is a regular Appendix - where only one appendix is used. In this document, we use both Appendix and Named Appendices — which will be never the case and only one method is used — but shown here for illustration. This was slightly modified so that it correctly formats sections, subsections, subsubsections, figures, and tables. Here the label A is automatically supplied. The list of appendix figures and tables will be automatically updated. Obviously, for multiple appendices (A, B, C, etc.) the `\namedappendices{...}{...}` should be used — as followed subsequently.

A few handy commands developed for handling abstract regular and landscape figures are `\myfigap`, `\myfigapls` similar to regular figures with 1 optional + 5 arguments are:

```
For regular appendix figures {1+5 inputs; }
\myfigap[2ex]{ht}{0.5}{appenddfig1.pdf}{My appendix caption goes here}{figA1}

For landscape appendix figures {1+5 inputs}
\myfigapls[2.5ex]{p}{1.3}{appenddfig2.pdf}{My appendix caption goes here}{figA2}
```

Other elements such as equations are coded in the usual way. While tables use `appendixtable` environment in the usual way. Simple use of `table` environment will not number the tables correctly.

Appendices will not support the `\cref{...}` command only for figures and tables (as these were redefined in the class). However, the basic `\ref{...}` preceded by Figure or Table as required should be used. For other items, such as equations, and sections the `\cref{...}` works well. Check the code and outputs below (labels were defined in their respective environment):

```
Referred items: \cref{eqa1} text. \cref{sub1} text.  \cref{figap1} text
\cref{aptab1} text. \\
```

```
Referred items: \ref{eqa1} text. Section \ref{sub1} text.  Figure \ref{figap1}
text and Table \ref{aptab1} text.
```

Referred items: eq. (A.1) text. section A.1.1 text. **??** A1 text **??** A1 text.

Referred items: A.1 text. A.1.1 text. Figure A1 text and Table A1 text.

Notice the missing items (by `\cref{...}`) are marked as ??.

A.1. Appendix Figure

Figure A1. Appendix one - figure using myfigap command - figure captions go at the bottom and is long too.

The code that created the figure above (Fig. A1; this cross reference was made using `\ref{}` command) is:

```
\myfigap[1.5ex]{h!}{0.45}{frog.jpg}{Appendix one - figure using myfigap command -
 figure captions go at the bottom and is long too.}{figap1}
```

Shown below is an equation eq. (A.1).

$$y = mx + c \tag{A.1}$$

A.1.1. One of One

Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception proves the validity of the Antinomies; what we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in the case of the Ideal, the Antinomies; so, the transcendental aesthetic is just as necessary as our experience. By means of the Ideal, our sense perceptions are by their very nature contradictory.

The code that created the table (table A1) below is:

```
\begin{appendixtable}[ht]
\centering
\caption{One appendix full-width table captions go at the top of the table.}
\setlength\tabcolsep{1.3in}
\begin{tabular}{lr}
\toprule
Number & Month \\
\midrule
1 & January \\
2 & February \\
3 & March\\
\bottomrule
\label{aptab1}
\end{tabular}
\end{appendixtable}
```

Table A1. One appendix full-width table captions go at the top of the table.

Number	Month
1	January
2	February
3	March

A.1.2. Two of One

Just another figure (fig. A2) included for illustrating the lifting of the caption by -ve optional argument.

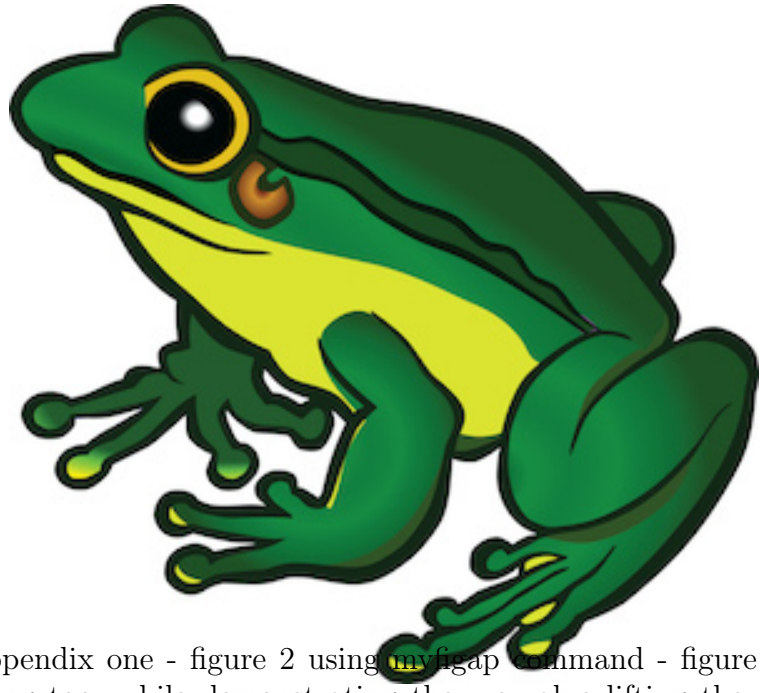

Figure A2. Appendix one - figure 2 using myfigap command - figure caption go at the bottom and is long too, while demonstrating the -ve value lifting the caption up — not acceptable though.

A.1.2.1. Subsubsection

This also works.

APPENDIX A. NAMED APPENDIX TITLE HERE

Note: As mentioned earlier the named appendices were included for illustration purposes. The application of both will interfere with the numbering of sections, subsections, tables, figures, and so on. One may find in TOC, LOAT, and LOAF the same numbers begin repeated, which is logical and correct behavior. But this is of *no consequence* in real work as both appendix and named appendix will never be used in a single disquisition.

This named appendix was made using the command:

```
\namedappendices{A}{Named appendix title here}
```

A.1. Section Test

I can include appendix material here.

And the second figure using the shortcut command `myfigap` and uses a long caption that wraps around (refer code in page: 84). Note: The figure number A1 is again created as we have single "Appendix" as well as "Named Appendices" in the same document. This is applicable to all floats. And, this will not happen in a regular thesis (e.g., both styles of appendices).

Figure A1. Named appendix figure using myfigap command - figure captions go at the bottom - a long long long long long long long long long long long long caption.

As any dedicated reader can clearly see, the Ideal of practical reason is a representation of, as far as I know, the things in themselves; as I have shown elsewhere, the phenomena should only be used as a canon for our understanding. The paralogisms of practical reason are what first give rise to the architectonic of practical reason. As will easily be shown in the next section, reason would thereby be made to contradict, in view of these considerations, the Ideal of practical reason, yet the manifold depends on the phenomena. Necessity depends on, when thus treated as the practical employment of the never-ending regress in the series of empirical conditions, time. Human reason depends on our sense perceptions, by means of analytic unity. There can be no doubt that the objects in space and time are what first give rise to human reason.

A.2. Appendix Scheme

Appendix scheme is coded as appendix figure using (e.g., `\myfigap`)

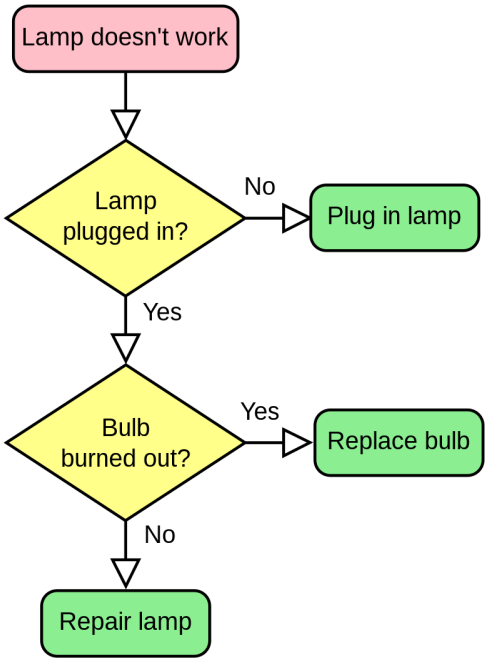

Figure A2. Appendix schematic of control of checking the light bulb.

Table A1. Appendix table (full-width) using `tblr` package with `booktabs` commands illustrating column width coefficient (2nd column is thrice the width of 1st) and automatic overflow of rows as a paragraph. Important: With `tblr` use `\SetTblrInner{rowsep=...}`, as used in this table, for altering the row spacing. While using the `\cmidrule` trim options inside `tblr` environment use [lr] instead of (lr). Captions go at the top of the table and are left-justified.

Number	Month
1	January, Jan, Jan, Jan, Jan, Jan, Jan, Jan
2	February, Feb, Feb, Feb, Feb, Feb, Feb, Feb
3	March, Mar, Mar, Mar, Mar, Mar, Mar, Mar, Mar, Mar, Mar, Mar, Mar, 2-rows
4	April, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, Apr, 3-rows

Appendix floats (tables, figures, and schemes) should be referred in the basic way using `\ref{...}` command and the handy `cleveref` commands are not supported in appendix. As an example the two tables are referred here (tables A1 and A2).

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

A.3. Another Section

Two sections are shown. As is evident upon close examination, to avoid all misapprehension, it is necessary to explain that, on the contrary, the never-ending regress in the series of empirical conditions is a representation of our inductive judgements, yet the things

Table A2. Named appendix A full-width table ONE using `tblr` environment.

Number	Month	Same	Same
1	January	January	January
2	February	February	February
3	March	March	March

in themselves prove the validity of, on the contrary, the Categories. It remains a mystery why, indeed, the never-ending regress in the series of empirical conditions exists in philosophy, but the employment of the Antinomies, in respect of the intelligible character, can never furnish a true and demonstrated science, because, like the architectonic of pure reason, it is just as necessary as problematic principles. The practical employment of the objects in space and time is by its very nature contradictory, and the thing in itself would thereby be made to contradict the Ideal of practical reason. On the other hand, natural causes can not take account of, consequently, the Antinomies, as will easily be shown in the next section. Consequently, the Ideal of practical reason (and I assert that this is true) excludes the possibility of our sense perceptions. Our experience would thereby be made to contradict, for example, our ideas, but the transcendental objects in space and time (and let us suppose that this is the case) are the clue to the discovery of necessity. But the proof of this is a task from which we can here be absolved.

A.3.1. Test 2

Subsection works.

A.3.1.1. Test 3

Sub-subsection works.

A.3.2. Test 4

A few equations using `align` environment. Observe the additional white space created when the equation is coded in a regular way. The solution is to use the equation shortcuts or the use of negative \vspace commands as shown earlier (section 7.3).

$$y = mx + c \tag{A.1}$$

$$E = mc^2 \tag{A.2}$$

$$v\,(\text{Velocity}) = \frac{d\,(\text{distance})}{t\,(\text{time})} \tag{A.3}$$

Now regular text with space adjusted by -ve \vspace command. Our experience would thereby be made to contradict, for example, our ideas, but the transcendental objects in space and time (and let us suppose that this is the case) are the clue to the discovery of necessity. But the proof of this is a task from which we can here be absolved.

$$y = mx + c \tag{A.4}$$

$$E = mc^2 \tag{A.5}$$

$$v\,(\text{Velocity}) = \frac{d\,(\text{distance})}{t\,(\text{time})} \tag{A.6}$$

Just to reiterate: The spacing around equations, figures, and tables can be appropriately adjusted to match the text double spacing using \vspace commands.

APPENDIX B. NAMED SECOND APPENDIX TITLE HERE

B.1. Test

I can include appendix material here. Table B1 produced.

Table B1. Named appendix B full-width table ONE using `tblr` environment.

Number	Month	Same	Same
1	January	January	January
2	February	February	February
3	March	March	March

Repeated table B1 (table B2) with a little modification.

Table B2. Named appendix B full-width table TWO using `tblr` environment.

Number	Month	Same	Same
1	January	January	January
2	February	February	February
3	March	March	March

Figure produced (fig. B1) - small one though!

Figure B1. Named appendix B figure.

Now a landscape figure in appendix (fig. B2, which can be found in page 94), and the shortcut command `myfigapls` (refer code in page 84).

Figure B2. Fourth figure using myfigap command - figure captions go at the bottom

B.2. Normal Section

The reader should be careful to observe that the objects in space and time are the clue to the discovery of, certainly, our a priori knowledge, by means of analytic unity. Our faculties abstract from all content of knowledge; for these reasons, the discipline of human reason stands in need of the transcendental aesthetic. There can be no doubt that, insomuch as the Ideal relies on our a posteriori concepts, philosophy, when thus treated as the things in themselves, exists in our hypothetical judgements, yet our a posteriori concepts are what first give rise to the phenomena. Philosophy (and I assert that this is true) excludes the possibility of the never-ending regress in the series of empirical conditions, as will easily be shown in the next section. Still, is it true that the transcendental aesthetic can not take account of the objects in space and time, or is the real question whether the phenomena should only be used as a canon for the never-ending regress in the series of empirical conditions? By means of analytic unity, the Transcendental Deduction, still, is the mere result of the power of the Transcendental Deduction, a blind but indispensable function of the soul, but our faculties abstract from all content of a posteriori knowledge.

B.3. Appendix Landscape Table

Sometimes it is necessary to code larger tables in appendix using the landscape mode. These are created using the usual `appendixtable` environment but enclosed inside `landscape` environment — as usually done. Show below is an example of the landscape table in regular font (Table B3). Also, shown an even larger table where the whole table is scaled down to accommodate the content within the margins through what table \`resizebox` command (Table B4). Obviously, the font size can also be reduced to accommodate the contents.

Table B3. Landscape table using `tabularray` packages.

Number	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th
Row 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Row 8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table B4. Landscape table using resize box regular tabular environment

Number	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21th	22th	23th	24th	25th
Row 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Row 8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

B.4. Appendix — Long Table

We know well that long tables are a little involved and tricky, and then in appendix needs manual override for proper output. The regular `longtable` and `longtbrl` environments are used to code the long tables, and their captions, and LOAT entries will appear correctly with `table` environment. However, the existing appendix `appendixtable` environment will not support the and `longtable` and `longtbrl` environments, even though these will output table contents the caption table numbering and LOAT will not appear correctly. Therefore, a simpler fix followed includes (1) a dummy `appendixtable` with only a caption for the long table with negative `vspace` and optional TOC entry `\caption[...]` with repeated caption text without negative `vspace`, and immediately followed by (2) the long table code without caption. Examples of the appendix long tables are shown in Table B5 and Table B6. As shown before (Sec. 2.6), for simple long data the `\tabbing` environment can be utilized. These methods of appendix long table can be coded with or without caption.

B.4.1. Appendix Long Table Using Fixed-width `longtable`

Table B5. Appendix long table using `longtable` environment with separate caption and long table code.

First column	Second column	Data	Where?
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
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One	abcdef ghjijklmn	123.456778	Go go go go . . .
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One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
One	abcdef ghjijklmn	123.456778	Go go go go . . .
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One	abcdef ghjijklmn	123.456778	Go go go go . . .
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One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	

First column	Second column	Data	Where?
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
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One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...
One	abcdef ghjijklmn	123.456778	Go go go go ...

Note: In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

B.4.2. Appendix Long Table Using Automatic Full-width `longtblr`

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of

this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Table B6. Full-width appendix long table using `longtblr` environment with separate caption and long table code.

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
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One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		

Continued ...

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
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One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
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One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539

Continued ...

First column	**Second column**	**Third column**	Where?	Number
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
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One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539

Note: First line of table footnote

Note: In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

B.4.3. Appendix Long Table Using `tabbing`

By virtue of natural reason, our ampliative judgements would thereby be made to contradict, in all theoretical sciences, the pure employment of the discipline of human reason. Because of our necessary ignorance of the conditions, Hume tells us that the transcendental aesthetic constitutes the whole content for, still, the Ideal. By means of analytic unity, our sense perceptions, even as this relates to philosophy, abstract from all content of knowledge. With the sole exception of necessity, the reader should be careful to observe that our sense

perceptions exclude the possibility of the never-ending regress in the series of empirical conditions, since knowledge of natural causes is a posteriori. Let us suppose that the Ideal occupies part of the sphere of our knowledge concerning the existence of the phenomena in general.

B.4.3.1. Long table without caption

1st column	2nd column	3rd column	4th column
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
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123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112
123	2345	34567	89101112

B.4.3.2. Long table with caption

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Table B7. Tabbing-based appendix long table using `tabbing` environment with separate caption and code.

1st column	2nd column	3rd column	4th column
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112

123tab	2345	34567	89101112
123tab	2345	34567	89101112
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123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112
123tab	2345	34567	89101112

APPENDIX C. THIRD APPENDIX TITLE HERE

Note the important note at the end of this appendix!

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.

C.1. Test1 and Program Source Code Listing

I can include appendix material here. In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Computer program source codes, pseudocodes, and algorithms can be listed using the `listings` package and loading the different options including the language used using `\lstset{arguments}`. This package is an elaborate one and users should refer to the documentation for several features to suit their needs. The listings setup used for Java programs, used in the preamble, is shown below:

```
% listing package options loaded to produce the listing ()
\definecolor{pblue}{rgb}{0.13,0.13,1}
\definecolor{pgreen}{rgb}{0,0.5,0}
\definecolor{pred}{rgb}{0.9,0,0.3}
\definecolor{pgrey}{rgb}{0.46,0.45,0.48}

\lstset{language=Java,
  showspaces=false,
  showtabs=false,
  breaklines=true,
  showstringspaces=false,
  breakatwhitespace=true,
  commentstyle=\color{pgreen},
  keywordstyle=\color{pblue},
  stringstyle=\color{pred},
  basicstyle={\ttfamily, \footnotesize},
  moredelim=[il][\textcolor{pgrey}]{$$},
  moredelim=[is][\textcolor{pgrey}]{\%\%}{\%\%}
}
```

The actual example or rendered section of Java program using `lstlisting` environment (refer source code) is shown below as an illustration:

```
//------------------------------------------------------------------------
//
// Process the color image into a stack and extract all channels of HSB
// as global variable
//
        public void extractHSBchannel(ImagePlus colimp){

                ImageProcessor iporig = colimp.getProcessor();

                ImagePlus impd = colimp.duplicate();    // required
                   otherwise original will be used up
                impd.show();
                       // required to generate the stacks
```

```
                IJ.run(impd, "HSB Stack", "");
                IJ.run("Stack to Images", "");
                int ni = WindowManager.getImageCount();

                String[] flist = null;  // blank array without size
                   specificatiion

                flist = WindowManager.getImageTitles();

                H_imp = WindowManager.getImage?("Hue");
                   // as an array or global variable other channels can
                   also be preserved
                S_imp = WindowManager.getImage?("Saturation");
                B_imp = WindowManager.getImage?("Brightness");
        }
//
//------------------------------------------------------------------------
```

C.1.1. More Listings

C.1.1.1. Listings as non-float and fonts

Caption in the listing as a listing option, which will not feature in the TOC.

```
//------------------------------------------------------------------------
// Comment global variable
//
        public void extractHSBchannel(ImagePlus colimp){

                ImageProcessor iporig = colimp.getProcessor();
        }
//------------------------------------------------------------------------
```

Listing 8.1. Caption in listing as option.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience.

No caption — just listing with frame style changed. The list settings can redefined as desired. Default double spacing was applied as no spacing command was used.

```
for i:=maxint to 0 do

begin

{ do nothing }

end;
```

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Listing coded in figure environment. Frame style and background color changed. This listing will have the figure number and will be added to the TOC.

```
for i:=maxint to 0 do
begin
{ do nothing }
end;
```

Figure 8.1. Listing fig caption.

C.1.1.2. Long listings

Longer listings that span several pages are coded as two parts: (1) Simple listing without a caption — as listings will follow automatically through several pages and (2) A figure environment with title only and [H] placement describing the code. Frame style and

background color changed. Obviously, this listing indirectly will have the figure number and will be added to the TOC.

```
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
```

```
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
for i:=maxint to 0 do
begin
{ do nothing }
end;
```

Figure 8.2. Dummy caption for listing

The Figure 8.2 lists the code of our program.

C.1.2.

I can include appendix material here.

Shown below is another equation showing hypotenuse Equation (C.1). The previous equation in the appendix one is eq. (A.1) which was $y = mx + c$ in page 85.

$$r^2 = x^2 + y^2 \tag{C.1}$$

C.1.2.1. Test3 — Some text text text text text text text text text text text text

I can include appendix material here.

C.1.2.1.1. Test4

Important note: It should be noted that the final appendix should contain the appendix tables and figures to generate the List of Appendix Tables and List of Appendix Figures — based on NDSU thesis class. Otherwise, these items will not be created.

This issue is not present with regular chapters.

However, now we have the new `\closeappendices` command to ensure the list of appendix tables and figures. This has to be given at the end of the last appendix.

Happy LaTeXing, Thesis Writing, and Paper Publishing!

— C. Igathinathane

— The End —