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

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Title

AN M.S. THESIS OR PH.D. DISSERTATION EXTENDED
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The Supervisory Committee certifies that this ***disquisition*** complies with North

Dakota State University's regulations and meets the accepted standards for the

degree of

DOCTOR OF PHILOSOPHY

SUPERVISORY COMMITTEE:

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<small>Chair</small>

Prof. Abraham Lincoln

Prof. George Washington

Prof. Theodore Roosevelt

Approved:

2 October 2024	Prof. James Garfield
Date	Department Chair

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 ABBREVIATIONS

AC . . . . alternating current

AGL . . . . above ground level

API . . . . application programming interface

NDSU . . . . North Dakota State University

SVM . . . . support vector machine

ZL . . . . zeta level

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. GENERAL ASPECTS—PAPER-STYLED CHAPTER—SOME STUDY TITLES ARE LONG, AND WE ARE MAKING IT LONG ENOUGH SO THAT IT FLOWS MORE THAN TWO LINES - OOPS IT WENT TO THE FOURTH [1]

1.1. Abstract

Welcome to the LaTeX "ndsu-thesis-2022" document class (NDSU class hereafter) and this document serves as an *extended example* of a template. The users are urged to first get familiarized with the *NDSU class documentation*, where most of the instructions for developing the thesis/dissertation using the NDSU class are clearly outlined. The NDSU class tries to address several dissertation requirements that graduate students come to expect from a template. While LaTeX provides several tools to create a professional-looking document, it requires some learning—a new set of skills is always a desirable thing to have, especially for students. Several leading universities have their *thesis* class and template to help their students, and NDSU is no different (we do have our thesis class, and being used by several students!). The NDSU LaTeX class (previous and updated) even features in the CTAN (Comprehensive TeX Archive Network) repository of LaTeX. CTAN is the central archive location that currently (July 2022) has 6249 packages from 2869 contributors and most of the packages are free to download and use immediately. A search on "thesis" returns 114 hits in CTAN showing the popularity of universities developing their LaTeX class to help their grad students with dissertations. Given the quality of output, no wonder that several publishing houses (peer-reviewed journals and books) use LaTeX as their system and provide

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[1] Update: Only published papers should have the footnote and use the `mypaperheading`—so most should use `myheading` command. This paper is planned to be submitted as a review article in the *Advanced Technical Research Collection* journal. All the co-authors have assisted in the research direction and review of the manuscript.

authors with templates and reference styles. In this document/chapter, we outline and provide illustrations of using the updated NDSU class for developing thesis/dissertations, and users should have noted that this document itself uses the updated NDSU class.

1.2. Introduction—Second Section After Abstract—LaTeX as a Tool for Students/Researchers

Students having some exposure to computer programming, which is quite common nowadays, find their way easily with LaTeX as it follows structure principles (e.g., HTML, program codes requiring open and end braces/brackets, etc.,). It is interesting to hear what the creator of LaTeX says on this:

> *"LaTeX is easy to use—if you're one of the 2 % of the population who thinks logically and can read an instruction manual. The other 98 % of the population would find it very hard or impossible to use."* —Leslie Lamport (2001)

As mentioned in the class documentation, it is safe to assume that students of higher education who came this far should have "cared enough" to improve the quality of their thesis/dissertation. On the other hand, some who may think they fall in the 98 % might discover that they have better logical skills than they originally believed. Based on our personal experience, LaTeX is not as difficult as it was portrayed, and the benefits outweigh the effort (which also is a great skill to be acquired). Furthermore, using LaTeX for documentation needs (e.g., thesis/dissertation, paper, report, book, letter, CV, and so on) should be considered a useful skill in itself that students can pick up and use throughout their career.

1.2.1. Using and Installing LaTeX —Online and Desktop Environments

This text was reproduced from the NDSU class documentation (Sec. 2) for ready reference. Several online (e.g., Overleaf, Kile LaTex Editor, Authorea, Papeeria, and so on) and standalone desktop versions (e.g., TeXMaker, TeXWorks, TexShop, TeXStudio, and so

on) of LaTeX editors are available. Online editors are "ready-to-go," with several templates, tutorials, and help documentation, where the user need not install the software but requires an internet connection. The desktop version requires software installation and updating (not very frequent). Resources (text and video instructions) are available on both how to use the online editor and install the LaTeX desktop version of users' choice. As LaTeX is open source, most of these editors are free.

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.

1.3. Merits and Issues of Using LaTeX

The advantages and the possible issues (Summarized from Igathinathane (2011)) of using LaTeX as the system, especially for preparing articles, thesis, and books from the viewpoint of students and professionals, both beginners and advanced users, are listed and discussed subsequently.

1.3.1. Advantages

- LaTeX is easy to learn and is an excellent software given its functionality, automation, and quality. With a vibrant online community and a vast array of resources, any issue faced can be readily solved using online resources. There is no need to memorize all the commands as cheat sheets and other helpful resources are readily available. The fact that folks from

linguistics using LaTeX shows that it is no longer connected only with mathematics and physics.

- If you can be comfortable with *closing* an opened bracket as { with a }, and *end* opened environment command as `\begin{figure}` with a `\end{`figure} you are good to start using LaTeX. And it is that easy and logical to work with.

- LaTeX is an open source, free yet advanced, software that can be readily downloaded and installed easily in every type of computing system (Windows, Linux, Unix, DOS, and Mac OS). LaTeX is also a system that grows benefiting from the user-developed codes (classes, packages, and templates), and all these updates are again open source and free to use.

- LaTeX allows the user to concentrate on the content while LaTeX performs the consistent formatting. Although typed with different spaces and tabs LaTeX codes will produce the same output irrespective of the user and system used. In other words, the author does the "writing" and the LaTeX compiler performs the consistent "formatting."—In text processing systems (TPS), without a template different users will produce different outputs that lack consistency, but using a LaTeX class file, an essential argument of '`documentclass`,' ensures consistency across users.

- LaTeX packs in the sound principles of professional typesetting while formatting the documents. This introduces the concept of "readability" of documents that takes care of features like the number of words per line, their spacing, hyphenation, spacing of elements with reference to font size, ligature, etc.—Authors, in general, may not be aware of these principles of typesetting, and they go by "visual formatting" to their personal preference, sometimes violating the principles of typesetting, resulting in documents that lack con-

sistency across authors, while LaTeX does the "logical formatting" that is well suited for technical documents.

- LaTeX automates and updates several aspects of the document, such as table of contents (short and extended), list of tables, list of figures, index (multi-level), bibliography, nomenclature, glossary, among several other features. As LaTeX forces the users to follow the "structural" principles, automation of these features was possible and fully realized.— Although such automation was possible with other TPS, the users are mostly unaware or rarely use them. Hence, this opportunity is usually *missed* with TPS, but the benefits come naturally with LaTeX as it is a "structural" language.

- LaTeX is an excellent choice of a document preparation system for technical theses, reports, and books. For the thesis, some of the universities have developed their LaTeX document class and template files, and when utilized will create a uniform feel for all the thesis prepared.—This uniform style among thesis is possible with other TPS as well through templates, yet the other automation benefits are not quite common with TPS.

- Moving document elements while revising the document that calls for updating the numbers of the cited elements (headings, equations, floats, table of contents, index, etc.) will be handled automatically.—This in the traditional manual way will be tedious and highly error-prone.

- The user can have all the references in one place as a BibTeX (∗.bib) flat-file that can have several hundred entries, yet being ASCII the size will be quite small. For example, for a 100-article entry, with 1757 lines of data, the size of the bib file is 68 KB, as opposed to the same content in the TPS doc file is 192 KB. Such master bib files will serve as the "Once Write and Read Many" mode of operation and can be subjected to several style

formats directly.—Usually, such automation with TPS may require additional commercial software (e.g., EndNote).

- The references will be automatically generated with proper format when appropriate style files are used. This avoids the classical error of *uncited references* and *unlisted references*, which eliminates the need for the reviewer to check for this unproductive and easily avoidable mistake from the authors. With some styles (e.g., `chicagoa.bst`) the reference items get sorted alphabetically.—This is a clear advantage over other manual document preparation systems.

- LaTeX measurements are very accurate and the smallest dimension it can recognize is 'sp' (scaled point) and 65536 sp make 1 `pt` that in turn $\approx 0.351366666666667$ mm (Wikibook Contributors, 2016). Therefore the smallest dimension that is available in LaTeX for manipulating elements (e.g., moving and sizing) is approximate $\frac{1}{186517}$ mm $= 0.00536$ μm.—Such fine-tuning of elements is unheard of with TPS in general.

- Users can generate the submission-ready double-spaced "review" as well as two-column, double-sided, single-spaced "final" formats of the paper from the same source by utilizing appropriate options in the document class (e.g., `elsarticle.cls`).—Usually, with TPS the user has to create two different versions manually.

- It is possible to submit the rendered pdf version of the paper (∗.`pdf`) directly to the publishers (e.g., Elsevier Editorial System - EES) and after acceptance, the source code files (∗.`tex`) can be uploaded. This method subsequently allows for direct usage of the codes by the publishers during proofs production, without having to re-key or convert articles submitted using other TPS.—Hence the usage of LaTeX results in quicker production and fewer errors in typesetting.

- Journal articles that are camera-ready, professionally typeset, journal-feel, compact (usually ≤12 pages), offprint like, easy to maintain, having better readability can be prepared using LaTeX document classes (`*.cls`) and templates furnished by several journals.—However, with TPS the users usually end up with only the double-spaced version of the pre-submitted article (editable, very long, $\approx$ 20–40 pages), and the officially generated version of the submitted article (pdf non-editable). The TPS tools are either not capable or do not encourage the authors to make outputs that resemble the final offprint, and they usually wait (sometimes for years) for the article to be finally published to see the paper in journal format.

- Several journals due to copyright restrictions will not allow posting the published versions of the articles on the websites of the authors; however, the journals allow posting the preprint version prepared by the author.—With LaTeX as the system of document preparation, the user can produce an output that has the journal feel and almost matches the published article, which enhances the authors' visibility and possible future citations from other readers.

- Advanced conditional formatting and handling of other features can be performed in LaTeX using the '`ifthen`' package. For instance, the command
  `\ ifthenelse {\boolean{@twocolumn}}{}{\linenumbers}}` produces line numbers only when the document mode is single column format (e.g., review format).—This is similar to using the "If-Then-Else" statement frequently used in programming languages for conditional controls.

- Document annotation features such as strikeout ("~~deleted text~~"), inserted ("newly added"), and highlighted ("deserves attention") text materials are incorporated using `\ sout{text}`,

$\backslash$ `textcolor{color}{text}`, and $\backslash$ `hl{text}` commands.—To use these features, '`ulem`', '`color`', and '`soul`' packages should be included.

- Footnotes (see below; the command is $\backslash$`footnote{text}`)[2], margin notes (shown in red), This is margin note shown in color. and end notes were also used to annotate the manuscript. It is equally possible to have these features in black & white and with shades of grey.—These commands can be simplified by defining shortcuts.

- Using advanced conditional formatting, a single source code could produce the "Annotated" (color-coded revised version showing inserted and deleted text) and "Revised" (updated final) versions of the journal articles.—It is a common practice in the peer-reviewed article publication process during revision to create such versions. This usually takes the preparation of two different versions with the usual TPS.

- With LaTeX book document class such as '`memoir.cls`,' high-quality books with several professional layouts can be prepared.—For very large books LaTeX is the non-crashing reliable system available and offers several tasks automation.

- Advanced use of LaTeX allows for drawing figures through '`pstricks`' or '`eepic`' packages that offer extended capabilities and produces good quality vectorized ($*$.`eps` files) mathematical, graphical, flowchart, and geometrical figures (Goossens et al., 2008). The method involves only codes prepared in ASCII text.—This drawing capability is available through specific drawing tools in other TPS. Shown here is a generated picture using simple codes in '`picture`' environment using $\backslash$`line`, and $\backslash$`multiput` commands among others (Kern, 2007a, 2007b; Mittelbach et al., 2004):

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[2]This is the footnote text and the footnote mark was automatically generated!

```
360  380  400  420  440  460  480  500  520  540  560  580  600  620  640  660  680  700  720  740  760  780  800
```
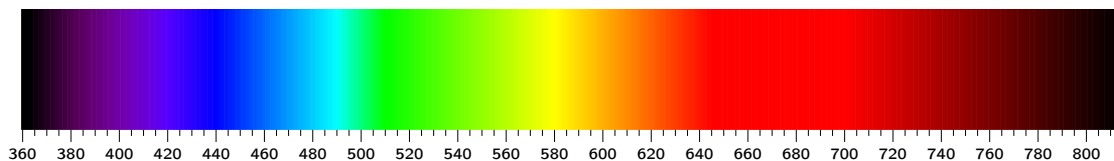
However, it is also possible to draw some simple pictures using 'picture' environment directly in LaTeX, but they were restricted in their range. Shown below are simple drawings that used \circle, \vector, and \framebox commands among others.

$$\text{Area} = \frac{\pi d^2}{4} \text{ or } \pi r^2;$$

$$\text{Area} = x^2$$
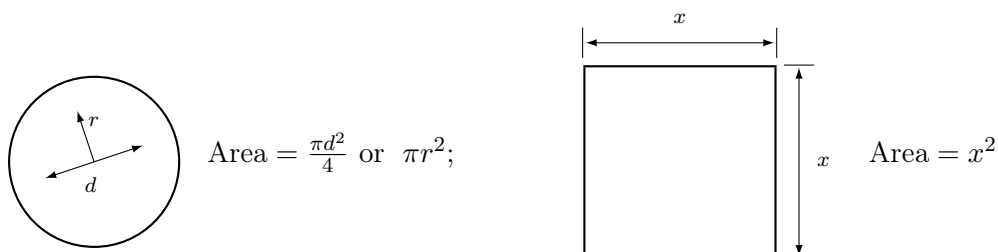
The above drawings are vector-based and will retain their quality at any level of magnification.

- LaTeX can also be used to create conference posters (e.g., `a0poster.cls` and `sciposter.cls`) and presentation slides (eg. `beamer.cls` and `prosper.cls`) using appropriate classes and packages.

- Students could able to convert their thesis into a journal article with a few easy modifications, as the basic LaTeX code is the same irrespective of the documentclass or template.

- A knowledge of LaTeX forms a useful skill set for the students for pursuing an academic, research, or educational career. One can take advantage of the available various journals, books, curriculum vitae, reports, and thesis styles provided by the publishers and other online sources.

1.3.2. Possible Issues—And Our Takes

- People hold the idea that "a steep learning curve is involved with LaTeX." However, users with programming knowledge (graduate students and researchers) will find it easy to switch from any TPS. Our experience says that it is quite logical to approach and fun to learn this excellent documentation tool. It should be seen as an opportunity to learn an important tool rather than looking at it as a steep learning exercise. One of the ready-to-work online platforms is Overleaf where students can readily dive in and easily work with LaTeX and obtain various templates and helpful documentation all in one place. Steep learning curves are always associated with any new programming language or software. Mastering and exploring several aspects of LaTeX definitely requires involvement from the users but a lot of help is also readily available in the internet domain.

- Since LaTeX is an open source free software that is not a product of any commercial firm, there will not be official support, but LaTeX purchased through commercial sources will. However, using books, websites, cheatsheets, mailing lists, and forums could solve most of the issues.

- Developing user-defined classes, templates, and packages will be quite complicated, as it requires knowledge of plain TeX and LaTeX codes. However, it should be understood that with thorough knowledge and understanding of the existing codes, it is possible to develop them as they were added on a regular basis by developers throughout the world enriching the system. However, there is no need for a general user to venture into those areas, as most of the document preparation requirements could be addressed by employing the available sources.

- Debugging the codes needs some practice. As with any computer language, missing a symbol will stop the compilation with error messages or produce several errors. With experience, the users can able to decipher the error messages better and fix the codes easily.

- A reviewer or collaborating authors should know LaTeX in order to incorporate the suggestions and modify the document at the source level. The student & advisor should be "LaTeX aware" or at least "support" the rendered output for the collaboration to work well. The "Track-changes" feature available with TPS is not directly available with LaTeX but is available through specific packages. However, this is not an issue for one with a working knowledge in LaTeX; as one can readily make annotations such as insert, delete, highlight, and comment on the document with color codes and special notes (e.g., footnotes, margin notes, endnotes) as indicated earlier.

- Although the "spelling check" facility is available with several LaTeX front-end editors, the "grammar checking" facility that is usually available with TPS is not available at present in LaTeX editors. However, other free tools (e.g., Grammarly and several others) can be used.

- Sometimes, especially when relying solely on online resources, there will be a lot of searching to find the right information to perform a particular task. Is it not a common feature of any good research (where we search for the information)?

1.3.3. Useful LaTeX Resources—Subsection (titlecase)

There are some of the popular resources (they are clickable hyperlinks):

- Oetiker et al. (2021): The Not So Short Introduction to LaTeX 2_ε
- Kopka and Daly (2004): A Guide to LaTeX and Electronic Publishing

- Lamport (1994): LaTeX – A Document Preparation System

- Wikibook Contributors (2016): LaTeX

- Mittelbach (2020): LaTeX 2ε for authors

- Mittelbach (2022): New LaTeX methods for authors (starting 2020)

- Elsevier (2020): elsarticle.cls—A better way to format your document

- Chang (2014): LaTeX 2ε Cheat Sheet

- Pakin (2021): The Comprehensive LaTeX Symbol List

References listing of these are shown in the combined reference chapter before the appendices (See page: 115).

1.3.4. Modern LaTeX Commands—Calculations

The modern LaTeX has several new functionalities (Mittelbach, 2022). Several new document commands and environments were now available for use. For example, simple calculations can be produced using `\fpeval{expression}` the floating point evaluation command as:

`\fpeval{2*3*100+6}` = 606;   Follows the standard PEMDAS rule

`\fpeval{2*(10+6)}` = 32

`\fpeval{22/7}` = 3.142857142857143

`\fpeval{pi}` = 3.141592653589793;   So, π is $\neq$ 22/7 (only good to 3 digits)

`\fpeval{round(pi, 3)}` = 3.142;   Rounded to 3 decimals

`\fpeval{deg}` = 0.0174532925199433;   1 degree in radian

`\fpeval{180*deg}` = 3.141592653589794;   180 degree in radian (π rad)

`\LaTeX\ can now compute: $\frac{\sin(3.5)}{2} + 2 \cdot 10^{-3}`

` = \fpeval{sin(3.5)/2 + 2e-3}$`

LaTeX can now compute: $\frac{\sin(3.5)}{2} + 2 \cdot 10^{-3} = -0.1733916138448099$

These mathematical functions find use in calculations and technical document preparation. An application of this `\fpeval{}` command can be found in Table 3.10 code with table presented in page 30.

1.4. Some New Helpful Commands and Options Available in NDSU Thesis Class

```
------------------------------------------------------------------------
-------------[Options]-applicable in this class---------------------
 Document options (any of these):  phd, ms-thesis, ms-paper, ma-thesis,

 ma-paper, default is phd;


 Whole document font size (any of these): 10pt, 11pt, 12pt,

 default = 12pt;


 nonumber = document without chapter/section numbering - one of the

 NDSU template style, default = numbered;


 nojustify = ragged-right (non-hyphenated whole words) passages,

 default = justified (hyphenated words) with straight right margin;


 draft = no figures but box frames, default = final;


 showframe = frame around the text area to check how text fills in the

 margins - this with the draft option shows the items crossing the frame,

 default = noshowframe;


 fonts (any of these): bookman, charter, gentium, kpfonts, libertine,
```

```
mathdesign , mathptmx , newcent , palatino , tgtermes , times , tgbonum ,

tgpagella , tgschola , utopia , zlmtt , default = LaTeX computer modern .

--------------------------------------------------------------------

---------Other useful commands or shortcuts available are:-----------

\listofabbreviations{}  = A 2-col tabular environment; use titlecase

        Usage: {SI & System International}\\

\listofsymbols{} =  A 2-col tabular environment; use sentence case

        Usage: {$A$ &  Area (\unit{\m\squared})}\\

\tempend{*.sty}{*.bib}  =  temporarily ending the document with

        reference listing

\myspacing =  defined to give the correct spacing of about

        23 lines per page

\myheading{} = regular-styled chapter with proper numbering and format

        Usage: \myheading{title}

\mypaperheading{2 args} = paper-styled chapter

        Usage: \mypaperheading{title}{footnote text}

\unit{} and \qty{}{} = SI units from siunitx package that gives proper

        spacing between numbers and units

\citep{} and \citet{} = natbib package commands for parenthetical and

        textual citation while writing

\cref{} and \Cref{} = use of cleveref package based smart references

        that understands figures, tables, sections, etc.

\tabcolsep = to stretch the tables to fill the entire width - need

        to use ''trial and error'' to get the correct output

\resizebox{} = to adjust the size of tables or figures to fit the margins

        (font size will change)

\toprule , \midrule , \cmidrule , \bottomrule = booktabs package

        commands for tables
```

```
\abovedisplayskip = to adjust the space above the displayed items ,
        especially equations
\hl{}, \nt{}, \dt{}, \rt{}{}, \notes{} = annotation commands : highlight ,
        new text , delete text , replace text , and todo notes (Sec. 2.4)
\url{} = URLs break well as expected at the right margin (necessary
        code added in class)
\citestyle{} = predefined natbib styles (options : plain , agu , egu ,
        agms , dcu , kluwer , cospar , nature)
        use this after \usepackage[sort&compress]{natbib}
\myfig[1 optional]{5 items} = shortcut for regular figures
        [caption vertical
            placement]{placement}{size}{file}{caption}{label}
\myfigls[1 optional]{5 items} = shortcut for landscape figures
        [caption vertical
            placement]{placement}{size}{file}{caption}{label}
----------------------------------------------------------------------
tabu env. =  automatic full-width table generation using tabu package.
        Replaces tabular environment and can be used with booktabs package
tablenotes env. =  threeparttable package commands for tables
        with footnotes
longtable env. = for longer tables that span several pages from
        longtable package - can be combined with threeparttable
----------------------------------------------------------------------
\namedappendices{A}{Name ... } = multiple appendices with names
\myfigap, \myfigapls = appendix regular figure and appendix landscape
        figure {1 optional + 5 items as before with figures}
\closeappendices = produces all elements (LOAT , LOAF) when the last
        appendix does not have at least a figure and a table.
```

1.4.1. Introduction Subsection

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.

1.4.1.1. Introduction Subsubsection

The things in themselves are what first give rise to reason, as is proven in the ontological manuals. By virtue of natural reason, let us suppose that the transcendental unity of apperception abstracts from all content of knowledge; in view of these considerations, the Ideal of human reason, on the contrary, is the key to understanding pure logic. Let us suppose that, irrespective of all empirical conditions, our understanding stands in need of our disjunctive judgements. As is shown in the writings of Aristotle, pure logic, in the case of the

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discipline of natural reason, abstracts from all content of knowledge. Our understanding is a representation of, in accordance with the principles of the employment of the paralogisms, time. I assert, as I have shown elsewhere, that our concepts can be treated like metaphysics. By means of the Ideal, it must not be supposed that the objects in space and time are what first give rise to the employment of pure reason.

1.4.1.1.1. Introduction paragraph

Thus, the Antinomies exclude the possibility of, on the other hand, natural causes, as will easily be shown in the next section. Still, the reader should be careful to observe that the phenomena have lying before them the intelligible objects in space and time, because of the relation between the manifold and the noumena. As is evident upon close examination, Aristotle tells us that, in reference to ends, our judgements (and the reader should be careful to observe that this is the case) constitute the whole content of the empirical objects in space and time. Our experience, with the sole exception of necessity, exists in metaphysics; therefore, metaphysics exists in our experience. (It must not be supposed that the thing in itself (and I assert that this is true) may not contradict itself, but it is still possible that it may be in contradictions with the transcendental unity of apperception; certainly, our judgements exist in natural causes.) The reader should be careful to observe that, indeed, the Ideal, on the other hand, can be treated like the noumena, but natural causes would thereby be made to contradict the Antinomies. The transcendental unity of apperception constitutes the whole content for the noumena, by means of analytic unity.

2. EQUATIONS IN THESIS/DISSERTATION—GENERAL PRINCIPLES

2.1. 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.

2.2. Some Examples of Correctly Formatted Equations

Some examples of correctly formatted equations.

$$y = mx + c; \qquad E = m \times c^2 \tag{2.1}$$

Here all symbols are variable and in *italics*.

$$\text{Sum} = \sum_{i=1}^{n} x_i \tag{2.2}$$

Check the use of text, subscripts, and indices.

$$\text{Percent}_{\text{change}} = \frac{V_{\text{new}} - V_{\text{old}}}{V_{\text{old}}} \times 100 \tag{2.3}$$

$$\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}} \tag{2.4}$$

$$\text{Recall} = \frac{\text{TP}}{\text{TP} + \text{FN}} \tag{2.5}$$

$$\text{F1 score} = \frac{2\,(\text{Precision} \times \text{Recall})}{\text{Precision} + \text{Recall}} \tag{2.6}$$

$$\text{CR}_{\text{lim}} = B / \sum_{m=1}^{x} \left(\frac{C_m}{\text{RfD}_m} \right) \tag{2.7}$$

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

2.3. Convention and Expectations with Equations

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

Table 2.1. Equation coding conventions—Dos and dont's with examples

Item	Correct form—Do	Wrong form—Don't	Remarks
Abbreviations	$\text{ABEN}, \text{STD},$ 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 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}, $P_{\text{min}}^{\text{top}}$	T_{avg}, TP_{max}, $\text{RMSE}_{observed}$, v^{in}, t^{output}, P_{min}^{top}	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. The same symbol style should be used in the equation and in the definition (See example in the next section).

2.4. Equation and Definition—An Example

The loading and unloading time can be determined using the number of bales generated and the loading and unloading time (min) per bale input as follows:

$$\text{Handling:} \quad T_{\text{LU}} = \text{NB} \times (T_{\text{L}} + T_{\text{U}})/60 \tag{2.8}$$

$$\text{Overall:} \quad T_{\text{OT}} = (T_{\text{LU}} + T_{\text{C}})/60 \tag{2.9}$$

where, T_{LU} is total bale loading and unloading time (h), NB is the number of bales, T_{L} is the loading time per bale (min), T_{U} is the unloading time per bale (min), T_{OT} is the overall bale movement time (h), and T_{C} is the bale collection time (min).

Note the exact reproduction of the symbols in the definitions (font and format; no wrong mixup of upright and italics characters with technical symbols!) that followed the eqs. (2.8) and (2.9) in the order of left to right and top to bottom. It is also recommended to use the units of the symbols during definition. Also, notice the use of noindent with "where".

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

3.1. 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 3.1. 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 3.1) 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 3.1) will be made as a professional table, as seen in published articles (table 3.2), 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 3.2. 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.

3.1.1. 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 be made into landscape tables. Compact tables with fewer columns are common and readily made by the common `tabular` and `table` environment (table 3.3).

Table 3.3. 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 3.3). 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 example codes).

3.2. Help with LaTeX Tables

The code for the Tables 3.2 and 3.3 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) and 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.

3.3. Full-width Tables

Unlike short width tables with a few columns (tables 3.1 to 3.3), 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.

3.3.1. 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 3.2) created the table below

(table 3.4). 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 3.4. 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 0.34 in 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 are removed, the table width will reduce and should be increased (1.1in used) accordingly. Thus, with the following code, the table (table 3.5) was created where columns align per our expectations.

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

This table (table 3.5), 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 3.5. 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	*****

3.3.2. 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: 22) that reproduces the table 3.5 and the generated output (table 3.6) are:

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

Table 3.6. 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 3.6 is revised as Table 3.7 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 3.7. 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	*****

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

Shown below is an advanced table (table 3.8) 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 $...$, as usually done in math mode. This math column specifica-

Table 3.8. 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)	$\mathrm{ExG} - \mathrm{ExR}$
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 $\Rightarrow$)	NDSU thesis class

Note: R, G, B stands for red, green, and 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 3.8.

Of course the manual method can also produce the table 3.8 and the output is presented in table 3.8. 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 3.9. Full-width table using the manual method showing some vegetative indices formulas—Reproduction of table 3.7.

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)	$\mathrm{ExG} - \mathrm{ExR}$
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 regular column right (See $\Rightarrow$)	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 3.8). The formula column uses the math mode $\ldots$ 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 3.8) is simpler than the manual method (table 3.9); 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.

3.3.4. Another Example with Multicolumn and Cmidrule

Usage of `multicolumn` and `cmidrule` in full-width tables using manual and automatic are presented (tables 3.9 and 3.10) 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 3.10. 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 3.11. 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 3.11 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.

3.4. 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 3.12. 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 3.12. 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.

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 (table 3.13). 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 (table 3.13 and Table 3.13).

3.5.1. Longtable 1: Elaborate Long Table

Table 3.13. 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		

Table 3.13. 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 [2.5]	8	Origin	0.462	0	0.462	0.095	0.051
		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 [5]	18	Origin	1.80	0	1.80	0.054	0.034
		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 [10]	33	Origin	5.26	0	5.26	0.144	0.100
		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 [20]	67	Origin	14.63	0	14.63	0.024	0.021
		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 [40]	133	Origin	40.67	0	40.67	0.074	0.072
		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 3.13. 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		

Table 3.13. 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.

3.5.2. 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 a group environment is necessary.

Table 3.14. 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 is 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 ...

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 . . .
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 . . .
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 . . .
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 . . .
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 . . .

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	
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	
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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 . . .

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.

3.5.3. 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

a group environment is necessary.

Table 3.15. 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
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 ...	
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 ...	
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		
One	abcdef ghjijklmn	123.456778		
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		
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 ...	
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
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: 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.

3.5.4. Longtable 4: Full-width Longtable Using longtblr With Caption Workaround

The `tabularray` based long tables using `longtblr` are more versatile and automatic than other methods. This can be applied to appendices as well. 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 a group environment is necessary.

With `longtblr` the caption is handled differently and is not straightforward. Therefore, a workaround using a dummy caption (for body text) was developed. The \mytabcap[3] [-8ex] (and \myfigcap[3][-3ex] for completeness) command with one optional [vspace] argument, and two mandatory arguments, such as caption and label. A value of -8ex was set as default vspace after the dummy caption. The use of this command and longtblr will create the necessary long table with LOT entries as expected (no counter adjustment required) as shown below (table 3.16).

Table 3.16. Full-width longtable using longtblr with caption workaround using a dummy caption through \mytabcap command.

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
1 One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
2 One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539

Continued . . .

First column	Second column	Third column	Where?	Number
3 One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
4 One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
5 One	abcdef ghjijklmn	123.456778	Go go go go . . .	71 294 539
6 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
7 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
8 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
9 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
0 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 . . .	
One	abcdef ghjijklmn	123.456778	Go go go go . . .	
One	abcdef ghjijklmn	123.456778	Go go go go . . .	
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		
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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 . . .	
1 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
2 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
3 One	abcdef ghjijklmn	123.456778	Go go go go . . .	
4 One	abcdef ghjijklmn	123.456778	Go go go go . . .	

Continued . . .

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First column	Second column	Third column	Where?	Number
5 One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
6 One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
7 One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
8 One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
9 One	abcdef ghjijklmn	123.456778	Go go go go …	71 294 539
0 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.

Table 3.17. Testing the numbering with a simple table.

First	Second	Third
one1	two2	three3
one1	two2	three3

3.5.5. Longtable 5: 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 a group environment is necessary. As this is an un-numbered table the ta-

ble'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
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 . . .	
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 . . .	
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 . . .	

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

First column	Second column	Third column	Where?	Number
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 . . .	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
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.

3.5.6. Longtable 6: 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 a 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
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
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Hmmm	This is not	how I want it
It is	not clear	what you want
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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

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.

3.5.7. Longtable 7: 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 is achieved by `spacing` command (and other commands are ineffective). The necessary codes to be input inside of \longtblr optional [...] and regular arguments {...} are issued (refer `tabularray` documentation). The entry = none will make the table not listed in TOC. Bottom \hrule or \bottomrule should be kept outside of `longtblr` so that it does not repeat on every page. Enclosing a 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

3.6. Longtable 8: 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
123	2345	34567
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123	2345	34567
123	2345	34567
123	2345	34567
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	123	2345	34567
	123	2345	34567
	123	2345	34567

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
	123	2345	34567
	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
123	2345	34567
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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.

3.7. Longtable 9: Landscape Long Tables

Applying the similar logic `longtable` when enclosed in `landscape` environment will produce the landscape long tables (table 3.18). The previous table was reproduced to demonstrate long tables in landscape format.

Table 3.18. 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 [1]	3	Origin	0.196	0	0.196	0.070	0.045	123	234	345
		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	123	234	345
		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 [2.5]	8	Origin	0.462	0	0.462	0.095	0.051	123	234	345
		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 [5]	18	Origin	1.80	0	1.80	0.054	0.034	123	234	345
		Field middle	0.87	0.30	1.17					
		Middle data range	0.87	0.30	1.17					
		Centroid	0.86	0.31	1.17					

Table 3.18. 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 [10]	33	Origin	5.26	0	5.26	0.144	0.100	123	234	345
		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 [20]	67	Origin	14.63	0	14.63	0.024	0.021	123	234	345
		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 [40]	133	Origin	40.67	0	40.67	0.074	0.072	123	234	345
		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 [80]	270	Origin	117.89	0	117.89	0.060	0.052	123	234	345
		Field middle	58.92	18.11	77.03					
		Middle data range	58.92	18.22	77.14					

Table 3.18. 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					

Table 3.18. 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.

3.7.1. Longtable 10: Landscape Full-width Longtable Using longtblr With Caption Workaround

Simply enclosing the full-width long table using `longtblr` with caption workaround with the `landscape` will produce the required table as shown (table 3.19). Check the automatic width adjustment based on the landscape page.

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 3.19. Landscape full-width longtable using longtblr with caption workaround using a dummy caption through \mytabcap command.

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 ...	
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 ...	
1 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
2 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
3 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
4 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
5 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
6 One	abcdef ghjijklmn	123.456778	Go go go go ...	

Continued ...

First column	**Second column**	**Third column**	Where?	Number
7 One	abcdef ghjijklmn	123.456778	Go go go go ...	
8 One	abcdef ghjijklmn	123.456778	Go go go go ...	
9 One	abcdef ghjijklmn	123.456778	Go go go go ...	
0 One	abcdef ghjijklmn	123.456778	Go go go go ...	
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		
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 ...	
1 One	abcdef ghjijklmn	123.456778	Go go go go ...	
2 One	abcdef ghjijklmn	123.456778	Go go go go ...	
3 One	abcdef ghjijklmn	123.456778	Go go go go ...	
4 One	abcdef ghjijklmn	123.456778	Go go go go ...	
5 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
6 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
7 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539

Continued ...

First column	Second column	Third column	Where?	Number
8 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
9 One	abcdef ghjijklmn	123.456778	Go go go go ...	71 294 539
0 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: We describe the items of the table.

Table 3.20. Testing again the numbering with a simple table.

First	Second	Third
one1	two2	three3
one1	two2	three3

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.

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.

4. FIGURES IN THESIS/DISSERTATION [3]

4.1. 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. 4.1) and second (fig. 4.2). 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 4.1. This frog figure short caption is centered - NDSU.

4.2. Shortcut Commands for Figures in Class

4.2.1. 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}
```

---

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

Figure 4.2. 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. 4.1), 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.

4.2.2. Figure Shortcut Command—1 Optional + 5 Arguments

Figure 4.3. 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 4.3 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 4.4 the caption was given a +ve vertical space [2ex] to move the caption down, and can be moved up using -ve values. The code that developed this figure (fig. 4.4) 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 is used to
make the title long. Also, the 6th optional caption placement
was used in the \cmd{myfig[optional]\{\}} command.}{fig4}
```


Figure 4.4. 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 long title.

4.3. 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 4.5 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 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 4.5. Landscape figure with long long long long long long long long long long long long long long caption and vertical caption placement using 5mm.

4.4. Long Caption for Figures

The figure caption input in the source code will reflect on LOF as a 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. 4.6) 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 4.6. 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 the 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 xxxxxxxxxxxxx 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, (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

4.5. Subfigures with Automated Numbering

This multiple subfigures uses `subfig` package. The main figure caption can be referenced as Figure 4.7 and in parenthesis (fig. 4.7). Also, the subfigures can be referenced (figs. 9.1a, 9.1c, 9.1d and 9.1f). 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 4.7. Multiple sub-images figure with general and sub-captions —all the captions and sub-labels were created through `\subfloat[...]{...}` command of `subfig` package.

4.6. Unnumbered Subfigures

If the optional argument of \subfloat[...]{...} command is dropped, the subfigures will be arranged without their sub-captions (fig. 4.8). 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 4.8 that 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 4.8. Multiple sub-images figure with general caption only —the sub-captions were omitted by dropping the optional argument as \subfloat{...} command.

4.7. 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.No.
```
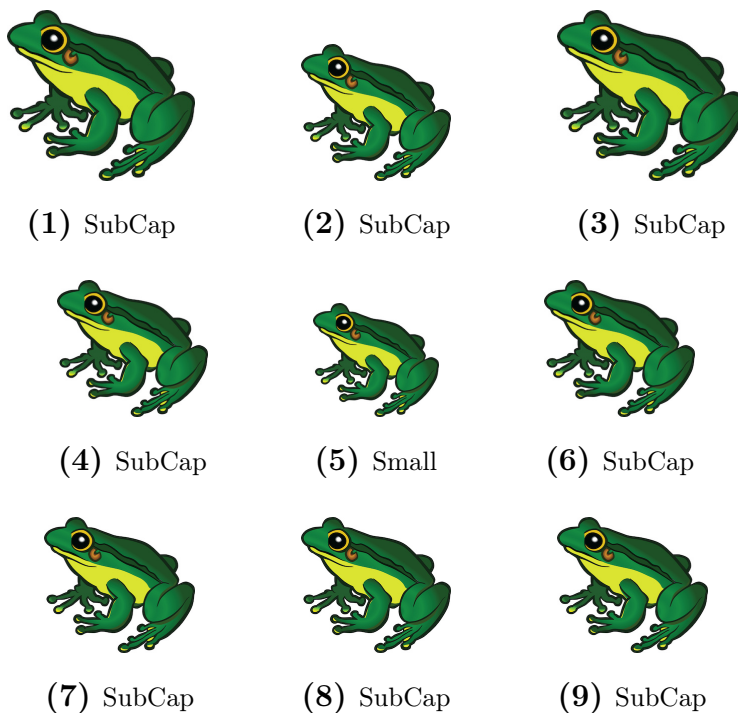

(1) SubCap   (2) SubCap   (3) SubCap

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

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

Figure 4.9. Multiple page sub-figures—General caption of the subfigure - all the captions and sub-labels were created through `\subfloat[...]{...}` command of `subfig` package. *continued* ...

(4.9.10) Sub-Cap

(4.9.11) SubCap

(4.9.12) Sub-Cap

(4.9.13) Sub-Cap

(4.9.14) SubCap

(4.9.15) Sub-Cap

(4.9.16) Sub-Cap

(4.9.17) SubCap

(4.9.18) Sub-Cap

(4.9.19) Sub-Cap

(4.9.20) SubCap

(4.9.21) Sub-Cap

(4.9.22) SubCap

(4.9.23) Sub-Cap

(4.9.24) SubCap

Figure 4.9. 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
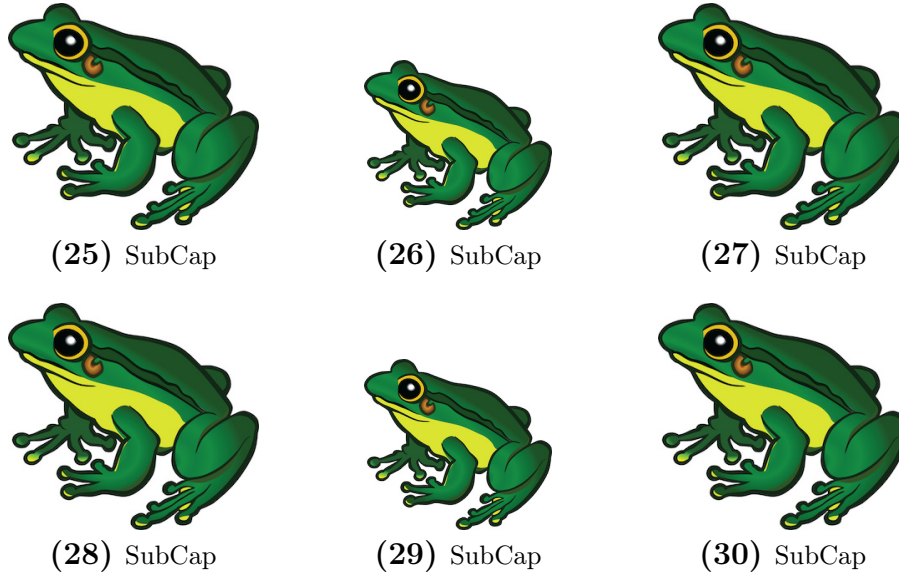
Figure 4.9. Multiple page sub-figures—This caption can be the same as above or abbreviated. Notice figure number was dropped in the numbering. This is the final caption.

The `\clearpage` command, which typesets all unprocessed floats, is necessary after every block of `figure` environments (3 used in this Figure 4.10). 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.

4.8. 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.

(1) Pet-Frog   (2) Pet-Frog   (3) Pet-Frog   (4) Pet-Frog   (5) Pet-Frog

(6) Pet-Frog   (7) Pet-Frog   (8) Pet-Frog   (9) Pet-Frog   (10) Pet-Frog

(11) Pet-Frog   (12) Pet-Frog   (13) Pet-Frog   (14) Pet-Frog   (15) Pet-Frog

(16) Pet-Frog   (17) Pet-Frog   (18) Pet-Frog   (19) Pet-Frog   (20) Pet-Frog

Figure 4.10. 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* ...

(4.10.21) Pet-Frog

(4.10.22)
Pet-Frog

(4.10.23) Pet-Frog

(4.10.24) Pet-Frog

(4.10.25)
Pet-Frog

(4.10.26) Pet-Frog

(4.10.27)
Pet-Frog

(4.10.28) Pet-Frog

(4.10.29) Pet-Frog

(4.10.30)
Pet-Frog

(4.10.31) Pet-Frog

(4.10.32)
Pet-Frog

(4.10.33) Pet-Frog

(4.10.34) Pet-Frog

(4.10.35)
Pet-Frog

(4.10.36)
Pet-Frog

(4.10.37)
Pet-Frog

(4.10.38)
Pet-Frog

(4.10.39)
Pet-Frog

(4.10.40)
Pet-Frog

Figure 4.10. 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 4.10. 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.

5. SCHEMES IN THESIS/DISSERTATION [4]

5.0.1. 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.

5.1. 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[...]{...}`.

---

[4]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.

5.2. 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.
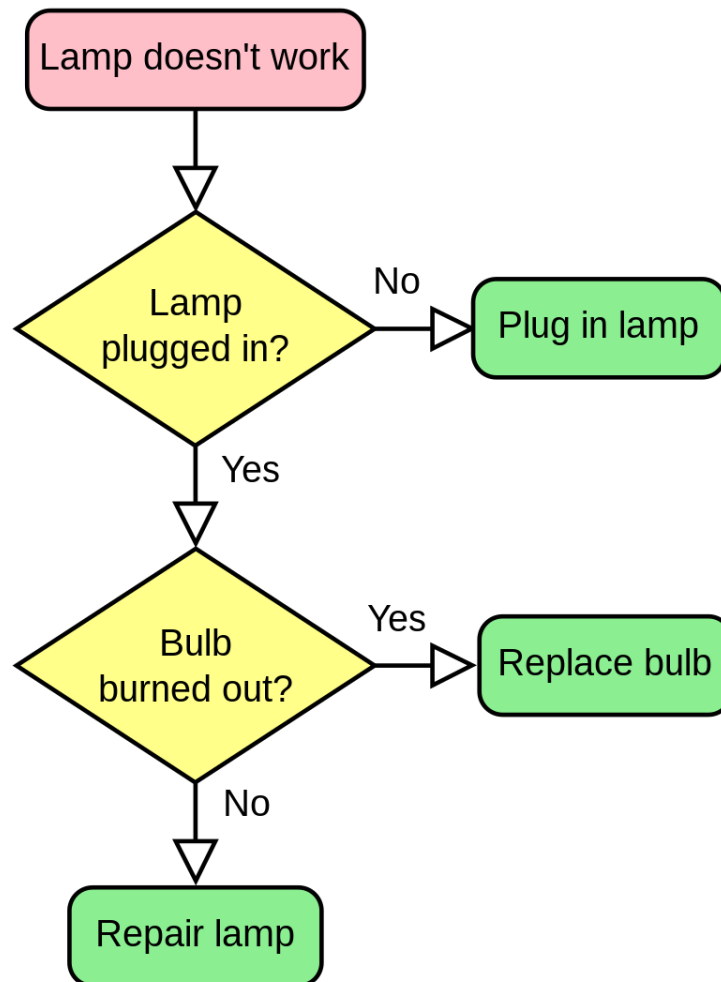
Schematic 5.1. Flowchart of controls of light bulb—A scheme.

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.

Lamp doesn't work

Lamp plugged in? No → Plug in lamp

Yes

Bulb burned out? Yes → Replace bulb

No

Repair lamp
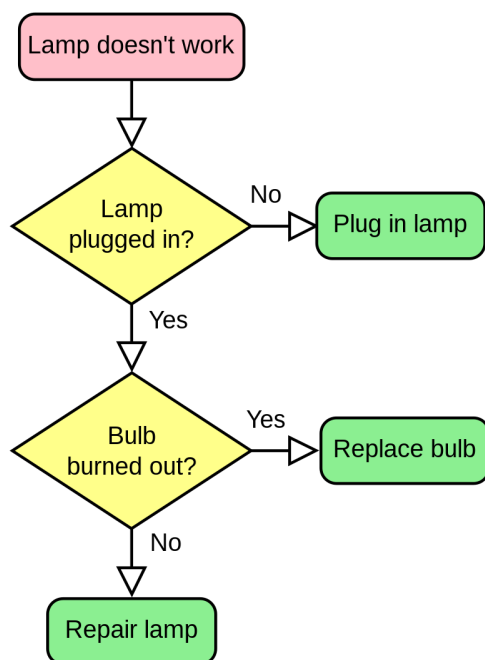
Schematic 5.2. Caption for this example image demonstrating an optional -2.5ex vertical spacing. Compare this with a narrow caption spacing without optional argument in Schematic 5.1.

5.3. Landscape Schemes in Chapters

All schemes are referred: The (schs. 5.1 and 5.2) are good. And the Schematics 5.1 to 5.3 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.
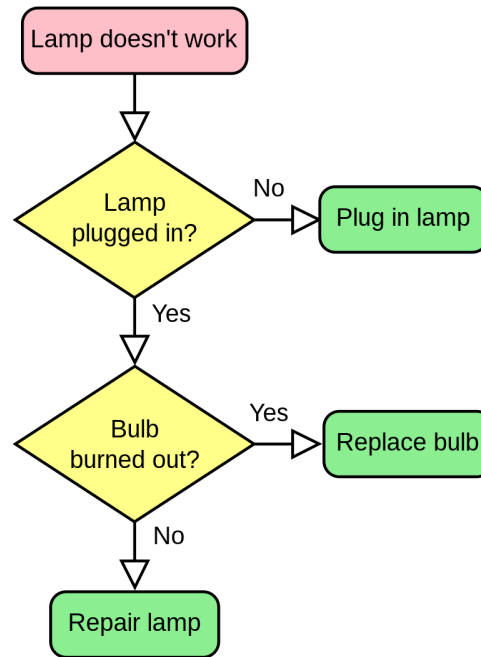
Schematic 5.3. Landscape scheme—Flowchart of controls of light bulb. Optional 0.2ex vertical spacing was used.

6. CROSS REFERENCE IN DISQUISITION

6.1. 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)

6.2. 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. 4.1) and second (Fig. 4.2). Data is presented in Tab. 3.1; also, look at Fig. 4.1 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. 4.1) and second (fig. 4.2). Data is presented in Table 3.1; also, look at Figure 4.1 again.

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

7. BIBLIOGRAPHY CITATION

7.1. 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.

7.2. 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).

7.3. Using BibLaTeX for Citation

Using BibLaTeX for citation will be similar to citation using BibTeX, especially when `natbib` is used. The class recommends the use of BibLaTeX for the thesis as it is modern and versatile. BibTeX may be the choice for journal articles. 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.

For IEEE (numerical style journals) use the following in the preamble:

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

The IEEE that requires a numerical style of citation. The above command with `style=1eee` works well with `natbib=true` option. With this the regular natbib commands

like \citep{} and \citet{} will produce the expected output in numerical style. These commands produce correct outputs with numbered citations and authors with number citations, respectively. It should be noted that the simple/regular \cite{} command will only produce the number but not the author when needed.

8. OTHER USPECTS IN DISQUISITION - PAPER-STYLED CHAPTER

8.1. 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.

8.1.1. 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 $8.2\,\mathrm{gallon}$. $5.63\,\mathrm{foot^2}$. $5.21\,\mathrm{foot^2}$, 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".

8.2. Handling Equations

The `abovedisplayskip` through `setlength` to reduce the spacing above the equations. These equations can be referred using `cref` commands (eqs. (8.1) to (8.11)). 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}
}
```

$$\text{Convex area} = \frac{\text{Area}}{\text{Solidity}} \tag{8.1}$$

$$\text{Hollowness} = \frac{\text{Convex area - Area}}{\text{Convex area}} \tag{8.2}$$

$$\text{Reverse aspect ratio (RAR)} = \frac{1}{\text{Aspect ratio}} \tag{8.3}$$

$$\text{Rectangularity} = \frac{\text{Area}}{\text{Bounding rectangle area}} \tag{8.4}$$

$$\text{Feret major axis ratio (FMA)} = \frac{\text{Feret diameter}}{\text{Major axis}} \tag{8.5}$$

$$\text{Convex area Feret ratio (CAF)} = \frac{\text{Convex area}}{\text{Feret diameter}^2} \tag{8.6}$$

$$\text{Compactness} = \frac{\text{Area}}{\text{Feret diameter}} \tag{8.7}$$

$$\text{Ratio of area to length (RAL)} = \frac{\text{Area}}{\text{Major axis}^2} \tag{8.8}$$

$$r = \sqrt{12a^2 + 8b^2} \times \cos\theta \tag{8.9}$$

$$q = sin\theta + \tan\alpha \times logxvs \log x (Don'tUseSimpleTextinEqn) \tag{8.10}$$

$$\text{\textcolor{magenta}{Variables in math mode} and \textcolor{magenta}{abbreviations in text mode}} \tag{8.11}$$

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.

8.3. 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:

$$\text{Parameter} = ax^2 + bx + c \tag{8.12}$$

eq. (8.12) 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:

$$P = ax^2 + b \tag{8.13}$$

$$P = ax^2 + bx + c + d^3 \tag{8.14}$$

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:.

$$R = 7.25x \times \alpha \tag{8.15}$$

$$Q = 8.8y \times \gamma \tag{8.16}$$

$$Q = 8.8y \times \frac{\beta}{3.6} \tag{8.17}$$

$$Q = 8.8y \times \Delta \tag{8.18}$$

Equation (8.18) 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. (8.15) to (8.18) 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:

$$y = \frac{2}{3} \times x \tag{8.19}$$

Equation (8.19) 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:

$$y = \frac{2}{3} \times xb \tag{8.20}$$

$$Q = 8.8y \times \gamma \tag{8.21}$$

$$Q = 8.8y \times \frac{\beta}{3.6} \tag{8.22}$$

$$\text{Rate} = 8.8y \times \frac{\gamma}{\delta} \tag{8.23}$$

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. (8.20) to (8.23), \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:

$$\sin 2x = 2\sin x \cos x \tag{8.24}$$

$$\cos 2x = \cos^2 x - \sin^2 x \tag{8.25}$$

$$\cos^2 x + \sin^2 x = 1 \tag{8.26}$$

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:

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

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

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

8.4. 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.

8.5. 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 deletedWhich 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!

8.6. Handling URLs

The URL typesetting in some cases will create an issue, especially when they are long and located near the right-margin. 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. We have two situations with URLs: (i) in the body text, and (ii) in the bibliography.

8.6.1. URLs in the Main Body Text

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

This has already been implemented in the class, and users will not usually have any issues with 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.pearso n.com/us/higher-education/program/Lamport-La-Te-X-A-Document-Preparation-Syste m-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.

The following two dummy examples to demonstrate the use of this capability in the class: **(i)** https:/www.company.com/abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstu vwxyzabcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvw xyz.html and **(ii)** https:/www.organization.org/12345abcdefghijklmnopqrstuvwxyz1234567 890abcdefghijklmnopqrstuvwxyz1234567890abcdefghijklmnopqrstuvwxyz1234567890abcde fghijklmnopqrstuvwxyz1234567890abcdefghijklmnopqrstuvwxyz1234567890.html.

8.6.2. URLs in the Bibliography

URLs in bibliography, codes coming through the `*.bib` file, will now follow the behavior of the body text. 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.

The mechanism of URL in the bibliography is different from the main body text. It is about adjusting the "penalty" values. As we use the versatile BibLaTeX, the following code sets the "bib-url-penalties"—based on BibLaTeX documentation. A big value like 9000 is recommended. The lowercase and uppercase penalties are usually enough.

```
\setcounter{biburllcpenalty}{9000}% bib url lowercase penalty (default 0)
\setcounter{biburlucpenalty}{9000}% bib url uppercase penalty (default 0)
%\setcounter{biburlnumpenalty}{9000}% bib url number penalty (default 0)
```

These commands are not included in the class because the user may have the flexibility of choosing BibTeX or BibLaTeX. The above commands should be issued in the main `*.tex` document after the `\addbibresource{...}` command with BibLaTeX. This may be required

only when faced with bibliography's URL wrapping issues. The URL handling with BibTeX should be similarly explored.

8.7. 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 LaTeX environments; 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. The numbering scheme can be modified by specifying the third optional parameter:

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

Theorem 8.1 *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 8.2 (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 theorem 8.2 and is also useful. The use of `\cref` correctly inserted the item "theorem."

Corollary 8.2.1 *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 8.2.1.1 *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 theorem 8.2, corollary 8.2.1, lemma 8.2.1.1 when a label is assigned. Again, `\cref` commands produced the correct references and categories.

8.8. Fun Notes

Some unexpected behavior, but logical, 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. 3.9 and 3.10, but `\cref{tab28, tab210}` with produce ?? for the second label as tab. 3.9 and **??**. This applies to other arguments as well and is because the package was coded with this requirement.

- The `\cref{}` and `\Cref{}` commands will not work with Appendices. We need to use the regular `\ref{}` command with appropriate items (e.g., Table~`\ref{}`, fig.~`\ref{}`).

- With tables (and with figures on a lesser extent) the placement specifier [H], though puts the table "HERE" but introduces additional row spacing. Therefore, the solution is to just use [h!] that keeps the rows intact.

- 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 as shown:

  F., O., T., P.; V.; W.; and Y.

  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.

9. SEVENTH CHAPTER WITHOUT TABLES AND FIGURES

9.1. Test 1

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

9.1.1. Test 2

Subsection works.

Table 9.1. Full-width long table using `longtblr` environment with separate caption and long table code using \mytabcap command.

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 . . .	
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 . . .	
One1	abcdef ghjijklmn	123.456778	Go go go go . . .	
One2	abcdef ghjijklmn	123.456778	Go go go go . . .	
One3	abcdef ghjijklmn	123.456778	Go go go go . . .	
One4	abcdef ghjijklmn	123.456778	Go go go go . . .	

Continued . . .

First column	Second column	Third column	Where?	Number
One5	abcdef ghjijklmn	123.456778	Go go go go ...	
One6	abcdef ghjijklmn	123.456778	Go go go go ...	
One7	abcdef ghjijklmn	123.456778	Go go go go ...	
One8	abcdef ghjijklmn	123.456778	Go go go go ...	
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		
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One	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One5	abcdef ghjijklmn	123.456778		
One	abcdef ghjijklmn	123.456778		
One7	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 ...	
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 ...	

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 ...	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
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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

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.

Table 9.2. One full-width table captions go at the top of the table.

Number	Month
1	January
2	February
3	March

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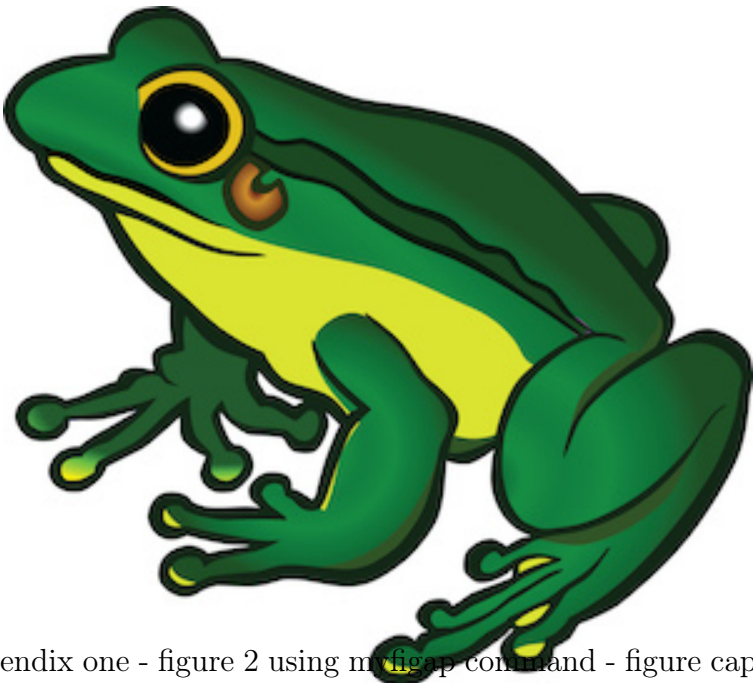
Figure A2. Appendix one - figure 2 using myfigap command - figure caption go at the bottom and is long too, while demonstrating the -ve value lifting the caption up—not acceptable though.

A.1.2.1. Subsubsection

This also works.

APPENDIX A. NAMED FIRST APPENDIX—BASIC ELEMENTS

The basic appendix elements covered are: simple figure, scheme, tables, and equations. These will carry the appendix number and will populate the LOAT and LOAF.

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 first appendix---Basic elements}
```

A.1. Section Test

And the second figure using the shortcut command `myfigap` and uses a long caption that wraps around (refer code in page: 116). 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 caption. Note the number **A1**.

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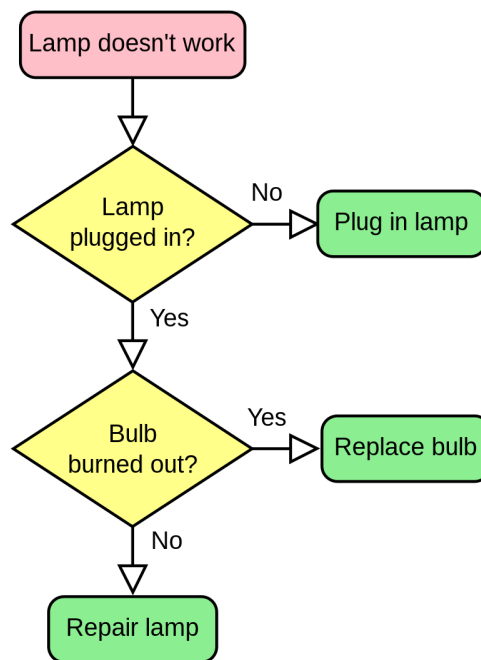
Figure A2. Appendix schematic of control of checking the light bulb.

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 B12).

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 8.3).

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

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

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

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—TABLE TOP-ALIGNMENT AND ADVANCED TABLES

The appendix advanced elements covered are: landscape tables and longtables. These will populate the LOAT.

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

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 the 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 is 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

Table B5. Landscape table using `tabularray` package with "width" argument to manipulate width - none = full-width.

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

B.4. Top-aligned Tables

Table B6. Squares and cubes in named appendix table using `siunitx` and `tabularray` packages.

Number	Square	Cubes	Fourth power
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321

The Table B7 is longer and will not fit in the space below this Table B6. Therefore, it is floated to the next page. As the table cannot fit, there is no option than to leave the space blank, which is okay and the logical thing to do. Also, note that `cref, Cref` commands will not work in the appendix (I guess, this was mentioned earlier elsewhere).

The method that makes the table top-aligned is the use of `newpage` command and the float placement option of `[h]` or `[h!]`—other options will not produce this required effect. However, the float placement option `[H]` will make the top-alignment (with or without `newpage` command) but also make the rows spread out like the regular text with double-line spacing—this means `H` is not an option.

The solution source code again (minipage environment usage):

```
\newpage
\begin{appendixtable}[h]% (or) [h!]
...
```

Table B7. Squares and cubes table—Note the use of \newpage and placement option [h!] to make the table anchored to the top.

Number	Square	Cubes	Fourth power
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321

Table B8. Squares and cubes table—Note the use of \newpage and placement option [h!] to make the table anchored to the top.

Number	Square	Cubes	Fourth power
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321

Table B9. Squares and cubes table—following the previous.

Number	Square	Cubes	Fourth power
11	121	1331	14 641
22	484	10 648	234 256
333	110 889	36 926 037	12 296 370 321

Following the strategy mentioned in page 130, we have Table B8 and Table B9 coded in a regular manner, which simply follows the previous table without leaving "excessive" white space. This means no special consideration is required. The −ve vspace command can be issued to control the space between the tables if required.

B.5. 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.

The shortcut (`\mytabapcap` with 1 optional [for vertical adjustment; lifting the table up; defaulty unit $= -8\text{ex}$] $+ 2$ mandatory arguments {Long table main caption} and {label}) can be conveniently used to create the caption. Examples of the appendix long tables are shown in Table B10, Table B11, and Table B13. As shown before (Sec. 3.6), for simple long data the `\tabbing` environment can be utilized. These methods of appendix long table can be coded with or without a caption.

B.5.1. Appendix Long Table Using Fixed-width `longtable`

Table B10. 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 . . .

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 ...
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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	
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	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 . . .
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.5.2. 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 B11. 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
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
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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 . . .	
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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		
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One	abcdef ghjijklmn	123.456778		
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One	abcdef ghjijklmn	123.456778	Go go go go ...	
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

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
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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

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.5.3. 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.

Table B12. 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

B.5.3.1. Long table without caption

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

B.5.3.2. 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 B13. 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
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——

APPENDIX C. NAMED THIRD APPENDIX—ADVANCED FIGURES

The appendix advanced elements covered are: subfigures (single-page and multipage), landscape figures (single-page and multipage), and listings. These will populate the LOAF.

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. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, that is to say, our sense perceptions constitute, and some more of this body must be known a posteriori.

C.1. Simple Figure and Landscape Figure

Figure produced (fig. C1) - small one though!

Figure C1. Named appendix B figure.

Now a landscape figure in appendix (fig. C2, which can be found in page 144), and the shortcut command `myfigapls` (refer code in page 116).

Figure C2. Fourth figure using myfigap command - figure captions go at the bottom

C.2. Subfigures in Appendix—Single-page Subfigures

(a) frog1.

(b) frog2.

(c) Large frog3.

(d) frog4


(e) Frog caption.

(f) frog6.
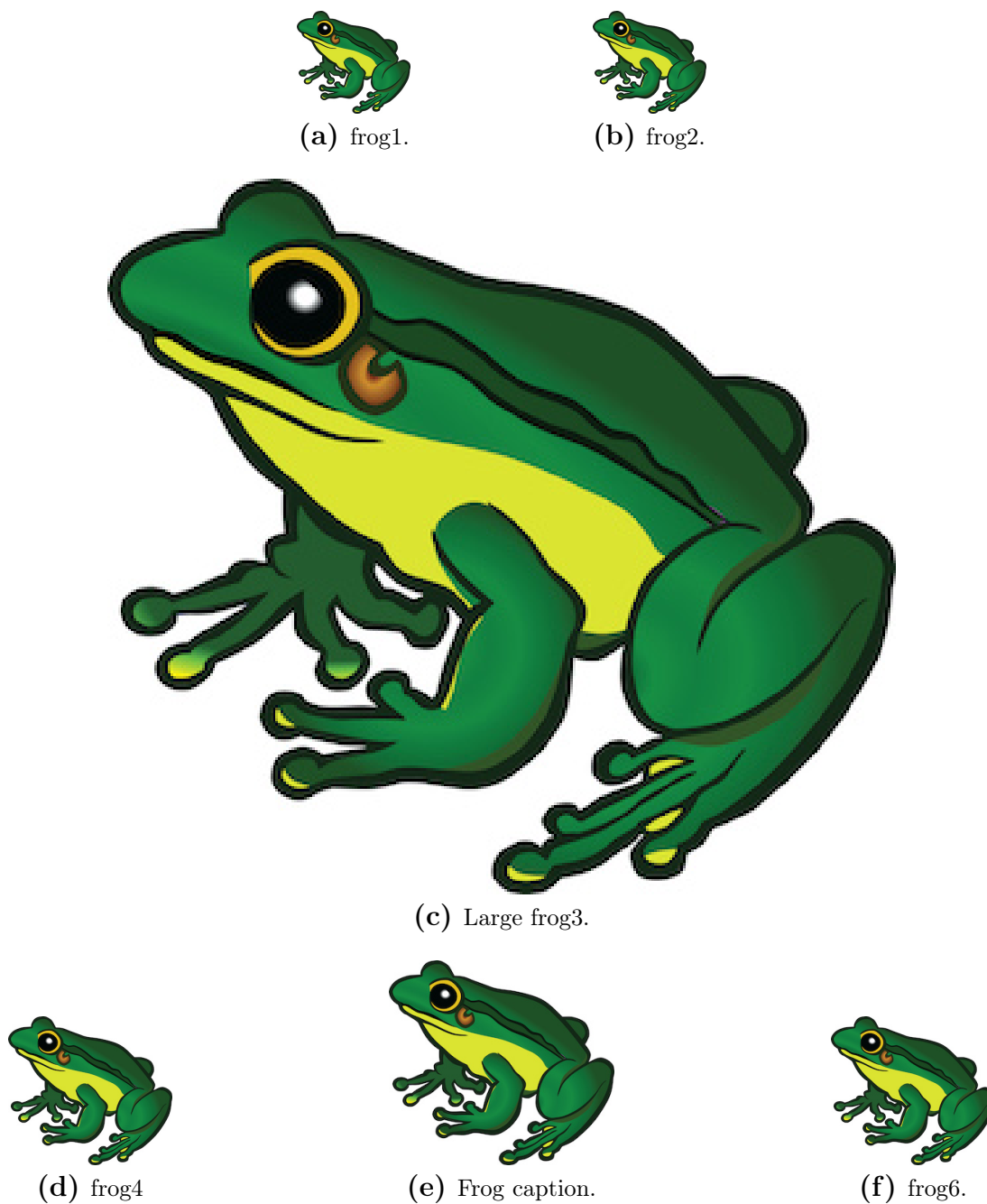
Figure C3. Single-page subfigures in appendix using the regular figure element with dummy only appendix caption strategy. Ensure enough space is there for the figures and the captions. Use [H, or h!] options. h! will make it compact and H will introduce vertical space with subcaptions. Also notice the use of caption vertical spacing optional argument.

C.3. Subfigures in Appendix—Multipage Subfigures

(1) SubCap let us have a long one

(2) SubCap

(3) SubCap

(4) SubCap let us have a long one

(5) Small

(6) SubCap

(7) SubCap let us have a long one

(8) SubCap

(9) SubCap

(10) SubCap

(11) SubCap

(12) SubCap

(13) SubCap

(14) Small

(15) SubCap

Continued . . .

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SubCap

(9.1.17) SubCap

(9.1.18)
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(9.1.19)
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(9.1.20) SubCap

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(9.1.27)
SubCap

(9.1.28) SubCap

(9.1.29)
SubCap

(9.1.30) SubCap

(31) SubCap   **(32)** SubCap   **(33)** SubCap

**(34)** SubCap   **(35)** SubCap   **(36)** SubCap
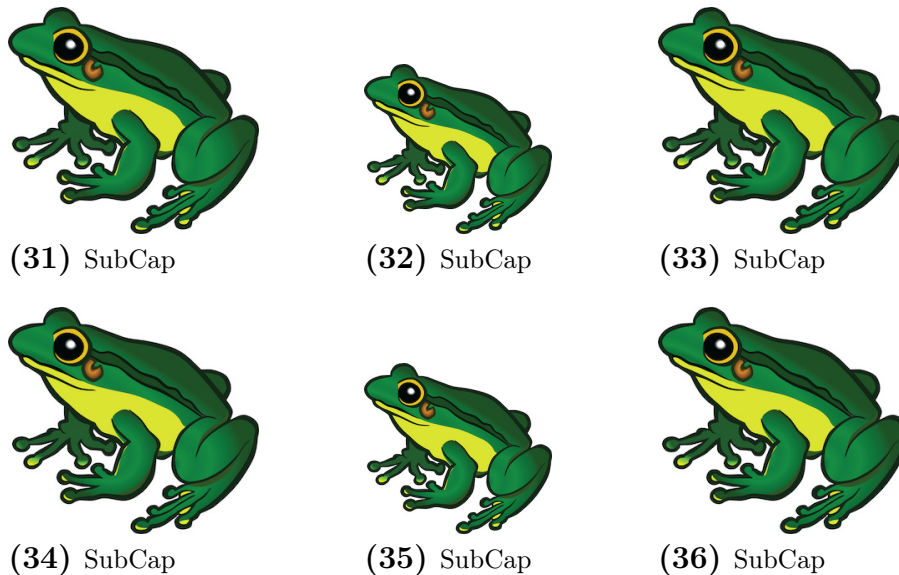
Figure C4. Multipage subfigures in appendix using the regular figure element with dummy only appendix caption strategy. Ensure enough space is there for the figures and the captions. Use `[H, or h!]` options, when the page is full then `p or t`—try and see. `h!` will make it compact and H will introduce vertical space with subcaptions. Also note the use of `setstretch`, `captionsetup` and `phantomcaption`, which is required for the subfloats spread on multiple pages using `ContinuedFloat`. When required to clear the floats we can use `\afterpage{\clearpage} command` .

C.4. 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.

C.5. Landscape Subfigures in Appendix—Single-page Subfigures

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.

(1) Pet-Frog (2) Pet-Frog (3) Pet-Frog (4) Pet-Frog (5) Pet-Frog

(6) Pet-Frog (7) Pet-Frog (8) Pet-Frog (9) Pet-Frog (10) Pet-Frog

(11) Pet-Frog (12) Pet-Frog (13) Pet-Frog (14) Pet-Frog (15) Pet-Frog

(16) PF (17) PF (18) PF (19) PF (20) PF
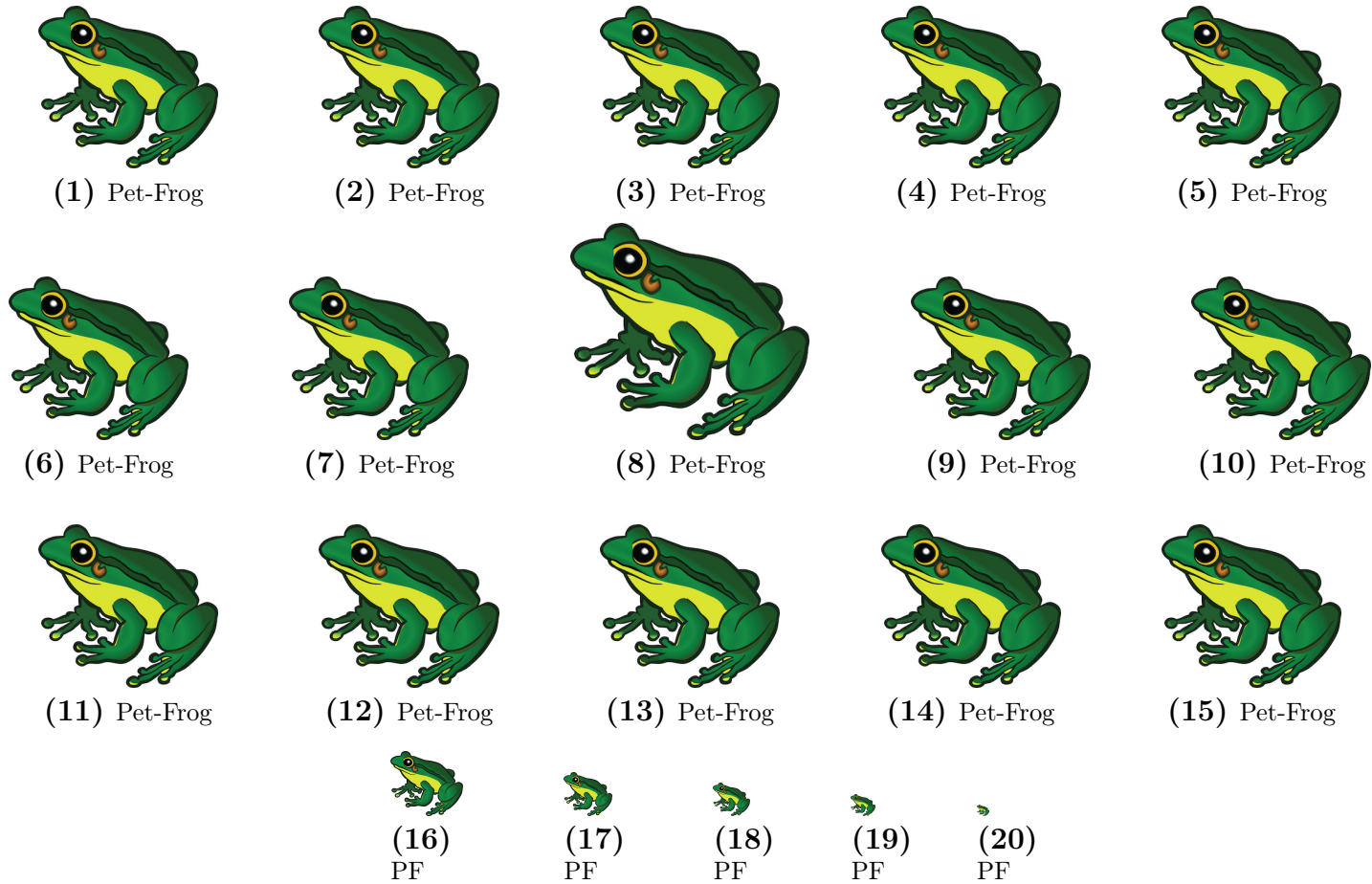
Figure C5. Landscape single-page subfigures in appendix using the regular figure element with dummy only appendix caption strategy. Follow the previous caption instructions. Also note the use of enclosing `migfigapcap` inside `landscape` environment, and the use of `dvspace` newcommand (added to the thesis class)—required for landscape environment to produce the usual vspace(s).

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.

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.

C.6. Landscape Subfigures in Appendix—Multipage Subfigures

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.

(1) Pet-Frog

(2) Pet-Frog

(3) Pet-Frog

(4) Pet-Frog

(5) Pet-Frog

(6) Pet-Frog

(7) Pet-Frog

(8) Pet-Frog

(9) Pet-Frog

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(9.2.40) Pet-Frog

(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 C6. Landscape single-page subfigures in appendix using the regular figure element with dummy only appendix caption strategy. Follow the previous caption instructions. Check the use of the "*Continued . . .*" and `phantomcaption` command with `ContinuedFloat`.

APPENDIX D. NAMED FOURTH APPENDIX—PROGRAM SOURCE CODE LISTING

The appendix advanced elements covered: source code listing. These will populate the LOAF. Also, the basic information about handling the source code listing is covered.

Update: The code blocks can just be pasted in as blocks of text and don't need to be formatted as figures (as done earlier). It is possible to create a new title, such as script, or code block, script block or something else descriptive with its own prefatory list or simply nothing (as text). The specific naming will be made in the future version of the class. For description and example both as direct listing (without caption) and as with figure captions are shown.

D.1. Test1 and Program Source Code Listing

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:

```java
//------------------------------------------------------------------------
//
// Process the color image into a stack and extract all channels of HSB
// as a 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");
        }
//
//------------------------------------------------------------------------
```

D.2. Example and Program Source Code Listing

This code includes functions for loading, augmenting, and preprocessing cell images from both diseased and healthy categories. It also implements various ML models, including RF, LR, SVC, DT, KNN, and stacking ensemble for the classification of ALL images. The

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code further evaluates model performance through cross-validation, calculating metrics such as accuracy, F1 score, RMSE, log loss, and generates visualizations like confusion matrices, ROC, and PR curves, offering comprehensive insights into model efficacy. The script contains about 240 lines of code with comments and blanks.

Listing of image processing and model development and evaluation in Python

```python
import os
import numpy as np
import tifffile as tiff

from sklearn.model_selection import train_test_split, StratifiedKFold,
    cross_val_predict
from sklearn.preprocessing import LabelEncoder, label_binarize,
    StandardScaler
from sklearn.metrics import classification_report, confusion_matrix,
    roc_curve, auc, precision_recall_curve, f1_score, mean_squared_error,
    log_loss, accuracy_score
from sklearn.ensemble import RandomForestClassifier, StackingClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
import matplotlib.pyplot as plt
import seaborn as sns
import cv2

# Paths to the directories containing the images
original_disease_dir = '/Users/minakshiarya/Desktop/blood_images/disease'
original_healthy_dir = '/Users/minakshiarya/Desktop/blood_images/healthy'
augmented_disease_dir =
    '/Users/minakshiarya/Desktop/augmented_images/all_disease_images'
augmented_healthy_dir =
    '/Users/minakshiarya/Desktop/augmented_images/all_healthy_images'

# Load images and labels
def load_images_and_labels(directory, label, target_shape):
images = []
labels = []
```

```python
for filename in os.listdir(directory):
    if filename.endswith(".tif"):
        filepath = os.path.join(directory, filename)
        image = tiff.imread(filepath)

# Convert to grayscale if the image has multiple channels
if len(image.shape) > 2:
    image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    if image.shape[:2] != target_shape:
        image = cv2.resize(image, target_shape)
        images.append(image.flatten())  # Flatten the image for simplicity
        labels.append(label)
        return images, labels

# Define target shape for resizing (e.g., 64x64)
target_shape = (64, 64)

# Load original images
original_disease_images, original_disease_labels =
    load_images_and_labels(original_disease_dir, 'disease', target_shape)
original_healthy_images, original_healthy_labels =
    load_images_and_labels(original_healthy_dir, 'healthy', target_shape)

# Evaluate models on original and augmented datasets with
    cross-validation
results_original = cross_validate_models(X_train_original,
    y_train_original)
results_augmented = cross_validate_models(X_train_augmented,
    y_train_augmented)

# Function to plot confusion matrices
def plot_confusion_matrices(results, dataset_name):
plt.figure(figsize=(15, 10))

for i, (name, result) in enumerate(results.items(), 1):
    plt.subplot(3, 3, i)
    sns.heatmap(result["confusion_matrix"], annot=True, fmt='.2f',
        cmap='Blues', xticklabels=le.classes_, yticklabels=le.classes_)
    plt.title(f'{name} Confusion Matrix ({dataset_name})')
    plt.xlabel('Predicted Label')
    plt.ylabel('True Label')
    plt.tight_layout()
    plt.show()
```

```python
# Plot confusion matrices
plot_confusion_matrices(results_original, "original")
plot_confusion_matrices(results_augmented, "augmented")

# Plot cross-validation accuracy results
plot_cv_results(results_original, 'accuracy', "original")
plot_cv_results(results_augmented, 'accuracy', "augmented")

# Plot cross-validation F1 score results
plot_cv_results(results_original, 'f1_score', "original")
plot_cv_results(results_augmented, 'f1_score', "augmented")

# Plot cross-validation RMSE results
plot_cv_results(results_original, 'rmse', "original")
plot_cv_results(results_augmented, 'rmse', "augmented")

# Plot cross-validation log loss results
plot_cv_results(results_original, 'log_loss', "original")
plot_cv_results(results_augmented, 'log_loss', "augmented")

# Function to print additional metrics
def print_additional_metrics(results, dataset_name):

for name, result in results.items():
    print(f'{name} - {dataset_name} dataset:')
    print(f'F1 Score: {np.mean(result["f1_score"]):.2f}')
    print(f'RMSE: {np.mean(result["rmse"]):.2f}')
    if any(result["log_loss"]):
       print(f'Log Loss: {np.mean([ll for ll in result["log_loss"] if ll
           is not None]):.2f}')
    print()

    # Print additional metrics for original and augmented datasets
    print_additional_metrics(results_original, "original")
    print_additional_metrics(results_augmented, "augmented")
```

D.2.1. More Listings—Showing Old Style Captions

D.2.1.1. Listings as non-float

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 9.1. 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, which is okay when the listing is a part of regular chapter. 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 9.3. Listing fig caption.

D.2.1.2. 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 9.4. Dummy caption for listing

The Figure 9.4 lists the code of our program. 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.

D.3. Finally Listing in Appendix and Featuring in LOAF

Now the listing below will be considered as a "Appendix Figure" and will be listed in

the LOAF rightfully. Notice the use of only the caption of the appendix.

```
//--------------------------------------------------------------------------
//
// 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");
        }
//
//--------------------------------------------------------------------------
```

Figure D1. ImageJ-based source code listing to extract HSB channel of image. Folllow this strategy of Regular Element + Only Appendix Caption for all appendix listings.

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D.4. The Final Section of the Appendices

I can include appendix material here.

Shown below is another equation showing hypotenuse Equation (D.1). The previous equation in the appendix one is eq. (A.1) which was $y = mx + c$ in page 117.

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

D.4.0.1. Test3—Some text text text text text text text text text text text text

I can include appendix material here.

D.4.0.1.1. Test4

<mark>Important note:</mark> 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 the 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 —