Daniel Vartanian

abnt: Quarto Format for ABNT Theses and Dissertations

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[Original/Revised version]

[Dissertation/Thesis] presented to the [School/Department] at the [University], as a requirement for the degree of [Master of Science/Doctor of Science] by the [Graduate program].

Area of concentration: [Area of concentration]

Supervisor: Prof. Dr. [Supervisor's full name]

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ERRATA

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Examination Committee

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Evaluation   [Approved/Rejected]

Prof. Dr.   [Full name]

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Evaluation   [Approved/Rejected]

Prof. Dr.   [Full name]

Institution   [School], [University]

Evaluation   [Approved/Rejected]

To the worm that first gnawed on the cold flesh of my corpse,
I dedicate, as a fond remembrance, these posthumous memories.[1]

[1] ASSIS, M. **Memórias póstumas de Brás Cubas** [The Posthumous Memoirs of Brás Cubas]. São Paulo: Companhia das Letras, 2014. ISBN 978-85-438-0163-6.

ACKNOWLEDGEMENTS

I would like to acknowledge this awesome Quarto format! :)

Nullius in verba[2]

---

[2] THE ROYAL SOCIETY. **History of the Royal Society**. Available from: <https://royalsociety.org/about-us/history/>. Visited on: 9 Sept. 2023.

ABSTRACT

[AUTHOR'S SURNAME], [Author's forename(s) initial(s)]. **abnt: Quarto Format for ABNT Theses and Dissertations** . 2026. 41p. [Dissertation/Thesis] ([Master of Science/Doctor of Science]) – [School/Department], [University], [City], 2026.

abnt is a Quarto format designed for creating theses and dissertations that comply with guidelines established by the Brazilian Association of Technical Standards (ABNT). Learn more at https://github.com/danielvartan/abnt.

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RESUMO

[SOBRENOME DO AUTOR], [Inicial(is) do(s) prenome(s) do autor]. **[Título]**. 2026. 41p. [Dissertação/Tese] ([Título acadêmico]) – [Escola/Faculdade], [Universidade], [Cidade/Local], 2026.

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Palavras-chaves: [Palavra-chave 1]. [Palavra-chave 2]. [Palavra-chave 3].

LIST OF FIGURES

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LIST OF ABBREVIATIONS AND ACRONYMS

F

Subscript indicating a relation with work-free days.

W

Subscript indicating a relation with workdays.

MCTQ

Munich ChronoType Questionnaire.

MCTQ^{PT}

Portuguese version of the MCTQ.

MEQ

Morningness-Eveningness Questionnaire.

MSF

Local time of mid-sleep on work-free days.

MSF$_{sc}$

Chronotype proxy. The midpoint between sleep onset and sleep end on work-free days. A sleep correction ($_{SC}$) is made when a possible sleep compensation related to a lack of sleep on workdays is identified.

MSW

Local time of mid-sleep on workdays.

LIST OF SYMBOLS

For an extensive list of chronobiology related symbols, please refer to Aschoff (1965) and Marques and Oda (2012).

τ

Period of a rhythm in free flow; only revealed under constant environmental conditions.

T

Zeitgeber period.

ϕ

Phase.

$\Delta\phi$

Phase shift.

$+\Delta\phi$

Phase advance.

$-\Delta\phi$

Phase delay.

Ψ

Phase relation.

CONTENTS

1   **[SHOWCASE] INTRODUCTION**

Consectetur maecenas aliquet facilisis, porta volutpat, porta nulla cursus montes? Blandit gravida interdum turpis, dignissim maecenas metus, aptent sem vehicula quis inceptos. Accumsan nascetur cubilia, laoreet sed quis magna tempor dui cras. Hendrerit tortor sapien mauris aptent imperdiet rutrum in primis augue tristique felis. Lacinia suspendisse purus tortor natoque sollicitudin euismod – nulla tempus dui posuere. Cras rhoncus vel, aliquam vivamus nec semper torquent praesent (Einstein, 1905). See Figure 1.

> The activity can be represented by a *general schema of problem-solving by the method of imaginative conjectures and criticism*, or, as I have often called it, by *the method of conjecture and refutation*. The schema (in its simplest form) is this:
>
> $$P_1 \rightarrow TT \rightarrow EE \rightarrow P_2$$
>
> Here P_1 is the *problem* from which we start, TT (the 'tentative theory') is the imaginative conjectural solution which we first reach, for example our first *tentative interpretation*. EE (*'error- elimination'*) consists of a severe critical examination of our conjecture, our tentative interpretation: it consists, for example, of the critical use of documentary evidence and, if we have at this early stage more than one conjecture at our disposal, it will also consist of a critical discussion and comparative evaluation of the competing conjectures. P_2 is the problem situation as it emerges from our first critical attempt to solve our problems.
>
> It leads up to our second attempt (*and so on*). A satisfactory understanding will be reached if the interpretation, the conjectural theory, finds support in the fact that it can throw new light on new problems — on more problems than we expected; or if it finds support in the fact that it explains many sub-problems, some of which were not seen to start with. Thus we may say that we can gauge the progress we have made by comparing P_1 with some of our later problems (P_n, say).
>
> (Popper, 1979, p. 164)

Adipiscing nostra aenean vivamus varius donec eleifend a ac feugiat mauris. Fermentum nunc suscipit dictumst aenean posuere ad massa fusce? Egestas dignissim, suscipit scelerisque blandit facilisi bibendum odio habitant? Commodo tincidunt aptent velit lobortis ut penatibus parturient sollicitudin gravida odio facilisis, imperdiet nibh vulputate faucibus cras gravida ad urna lobortis in tempor fusce scelerisque; magnis hendrerit – tempus auctor aenean, venenatis malesuada torquent, dictum, diam nullam ad sagittis facilisi gravida metus cursus pulvinar rutrum torquent curae aliquam dui, id torquent duis tincidunt ornare torquent nam magna sapien suscipit (Krakauer, 2019; Mitchell, 2009).

Figure 1 – Karl Popper (July 25, 1902 – September 17, 1994).
One of the 20th century's most influential philosophers of science.

Source: Steve Pyke.

1.1   HEADING 2

Adipiscing aliquet luctus dapibus hac mattis urna metus eleifend felis? Penatibus suspendisse lacinia tristique – porttitor quisque est. Integer consequat donec dui faucibus netus fames eget porta fames. Montes aliquam vivamus magnis nascetur ad non dui magnis magnis condimentum! Tortor hendrerit orci feugiat mi, tristique; ante accumsan venenatis. Nisi posuere et ut nulla dictumst metus dui etiam vel ultricies velit (Pearson, 1900). See Table 1.

Table 1 – A sample of the penguins dataset

Species	Island	Bill length (mm)	Bill depth (mm)	Flipper length (mm)
Gentoo	Biscoe	43.5	14.2	220
Adelie	Torgersen	36.2	17.2	187
Chinstrap	Dream	58.0	17.8	181
Adelie	Dream	37.0	16.9	185
Adelie	Biscoe	38.1	16.5	198

Source: Based on Horst, Hill, and Gorman (2020) penguin dataset.

1.1.1 Heading 3

Consectetur facilisis montes, conubia eu justo luctus ante pulvinar ut vehicula. Tempor nam in non, ridiculus proin et molestie fames. Praesent curabitur est eu massa senectus proin; consequat malesuada nascetur. Vestibulum ut vel fermentum commodo ac suscipit sagittis; mi cubilia cursus inceptos in, dignissim penatibus inceptos mauris (Neyman; Pearson, 1928a). See Table 2.

Amet mollis – egestas risus cubilia enim duis? Ultricies id mus nec integer; mollis libero. Facilisis maecenas tellus euismod, inceptos consequat morbi. Leo viverra ultricies condimentum venenatis consequat taciti viverra? At suspendisse volutpat phasellus quisque vitae porttitor enim. Placerat quisque rutrum nisl praesent; aliquam pharetra fringilla. Na fringilla (Neyman; Pearson, 1928b). See Figure 2.

Figure 2 – Gini index by Brazilian municipality in 2010. Values range from 0 (perfect equality) to 1 (total inequality).
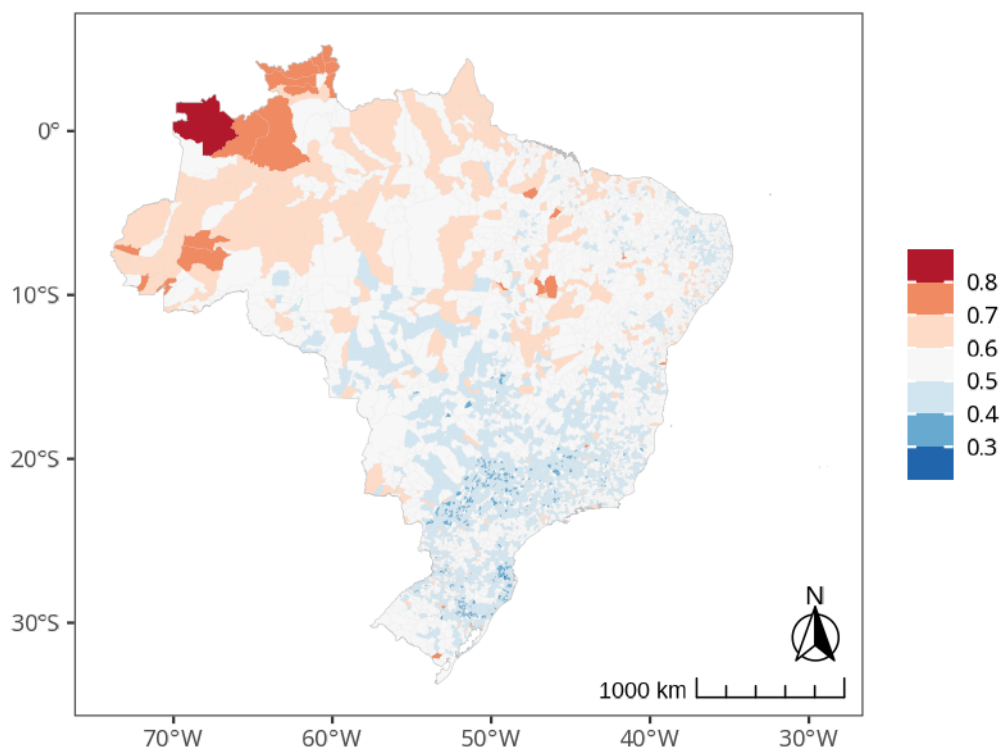
Source: Data extracted from Instituto Brasileiro de Geografia e Estatística (n.d.), processed by Vartanian and Carvalho (2025).

Table 2 – Cohen's benchmark for effect sizes

Test	Relevant Effect Size	Effect Size Classes		
		Small	**Medium**	**Large**
Comparison of independent means	d, Δ, Hedges' g	0.20	0.50	0.80
Comparison of two correlations	q	0.10	0.30	0.50
Difference between proportions	Cohen's g	0.05	0.15	0.25
Correlation	r	0.10	0.30	0.50
	r^2	0.01	0.09	0.25
Crosstabulation	w, φ, V, C	0.10	0.30	0.50
ANOVA	f	0.10	0.25	0.40
	η^2	0.01	0.06	0.14
Multiple regression	R^2	0.02	0.13	0.26
	f^2	0.02	0.15	0.35

Notes: The rationale for most of these benchmarks can be found in Cohen (1988) at the following pages: Cohen's d (p. 40), q (p. 115), Cohen's g (pp. 147–149), r and r^2 (pp. 79–80), Cohen's w (pp. 224–227), f and η^2 (pp. 285–287), R^2 and f^2 (pp. 413–414).

Source: Adapted from Ellis (2010). Based on Cohen (1988).

1.1.1.1 Heading 4

Lorem volutpat hendrerit porta sem vehicula aliquam sed phasellus. Ante cursus primis taciti interdum augue elementum imperdiet eu. Placerat arcu nisi tristique sodales. Convallis enim lacus class suspendisse porttitor litora ante conubia risus turpis! Quis nisl (Markov, 2006). See Figure 3.

Figure 3 – Marginal distributions of weight (*1000 lbs*) and fuel efficiency (*miles per gallon*) for combustion engine vehicles
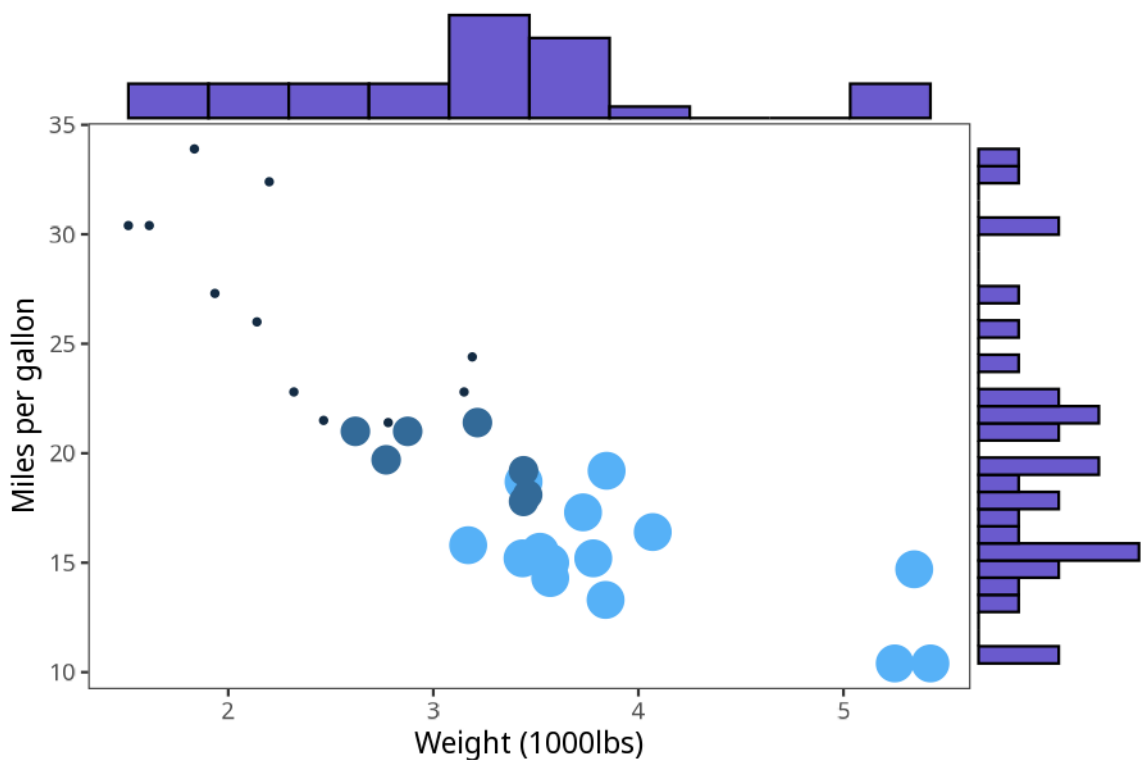
Source: Data extracted from the 1974 Motor Trend magazine, published by Henderson and Velleman (1981). Visualization by Holtz (2023), available at The R Graph Gallery.

1.1.1.1.1 Heading 5

Sit est tincidunt; augue quisque senectus natoque ullamcorper, convallis curabitur vitae nunc. Tristique nullam sed, scelerisque egestas commodo facilisis feugiat vitae natoque lobortis praesent? Ad pulvinar quisque hendrerit magnis dictumst? Scelerisque dictumst augue per non cras, aliquet aliquam posuere facilisi

varius porta auctor. Laoreet erat class, parturient hendrerit integer nibh, curabitur pulvinar accumsan tortor, sociosqu sodales, mollis, viverra mi bibendum, nulla rutrum, condimentum quam malesuada torquent ultricies penatibus non viverra mattis, mollis morbi sagittis (Perezgonzalez, 2015). See Definition 1.1.

Definition 1.1 (Multiple Linear Regression)**.** A linear regression of Y on k variables $X_1, \dots, X_k$, rather than on just a single variable X. In a problem of multiple linear regressions, we obtain n vectors of observations $(x_{i1}.\dots, x_{ik}, Y_i)$, for $i = 1, \dots, n$. Here x_{ij} is the observed value of the variable X_j for the ith observation. The $E(Y_i)$ is given by the relation: (DeGroot; Schervish, 2012, p. 738)

$$E(Y_i) = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik} \tag{1.1}$$

Adipiscing auctor sagittis, netus, mollis pulvinar interdum inceptos. Primis nascetur congue nam class, leo nunc – faucibus fermentum tincidunt fames vestibulum curabitur? Auctor justo arcu, posuere id dignissim risus sapien. Tristique inceptos mi arcu viverra gravida malesuada arcu nam dictum nisl. Fermentum pretium lobortis dignissim sociosqu, vulputate nisi cubilia vehicula laoreet. Eros libero dui ligula diam cubilia pharetra vivamus commodo sociosqu pellentesque, ut nulla nibh – tincidunt quisque semper cum, eros bibendum gravida libero aliquet netus, montes, turpis: rutrum, eu mollis, gravida diam fames fames, himenaeos viverra pharetra, sed congue, sapien integer ullamcorper euismod auctor cras nec aliquam sociis lectus dui porta fames aptent (Epstein, 2013). See Table 3.

Table 3 – Type I and type II errors

Decision about H_0	H_0 **True**	H_0 **False**
Accept	Correct inference (True negative) $(1 - \alpha)$	Type II error (False negative) (β)
Reject	Type I error (False positive) (α)	Correct inference (True positive) $(1 - \beta)$

Source: Based on Casella and Berger (2002, p. 383)

2 **[SHOWCASE] DEVELOPMENT**

Ipsum mauris nec turpis ultricies dapibus montes, habitasse proin nostra posuere nulla! Facilisis magnis iaculis nunc dis facilisi tristique fusce phasellus inceptos senectus! Sem imperdiet pharetra rutrum interdum metus primis tempus posuere est libero. Fermentum purus viverra porttitor, bibendum, placerat pulvinar nostra volutpat nulla neque, venenatis parturient: convallis mi, ultricies nam viverra quisque neque natoque duis suscipit turpis (Watson; Crick, 1953).

2.1 HEADING 2

the Lorenz system, originally introduced by Edward N. Lorenz (1963) in his seminal paper, comprises three coupled, nonlinear ordinary differential equations that model atmospheric convection, effectively illustrating the chaotic nature of weather patterns.

The dynamics of the model are represented by the following set of first-order, nonlinear differential equations:

$$
\begin{aligned}
\frac{dx}{dt} &= \sigma(y - x), \\
\frac{dy}{dt} &= x(\rho - z) - y \\
\frac{dz}{dt} &= xy - \beta z
\end{aligned}
\tag{2.1}
$$

In these equations:

- x represents the rate of convection;
- y denotes the horizontal temperature variation;
- z indicates the vertical temperature variation;
- σ, ρ, and β are system parameters corresponding to the Prandtl number, Rayleigh number, and specific physical dimensions of the fluid layer.

The phase space visualization of this system (Figure 4) reveals intricate patterns and behaviors, including the presence of strange attractors, which are indicative of chaotic dynamics. To learn more about the Lorenz system, see Lorenz (2008).

Figure 4 – Phase space visualization of the Lorenz system
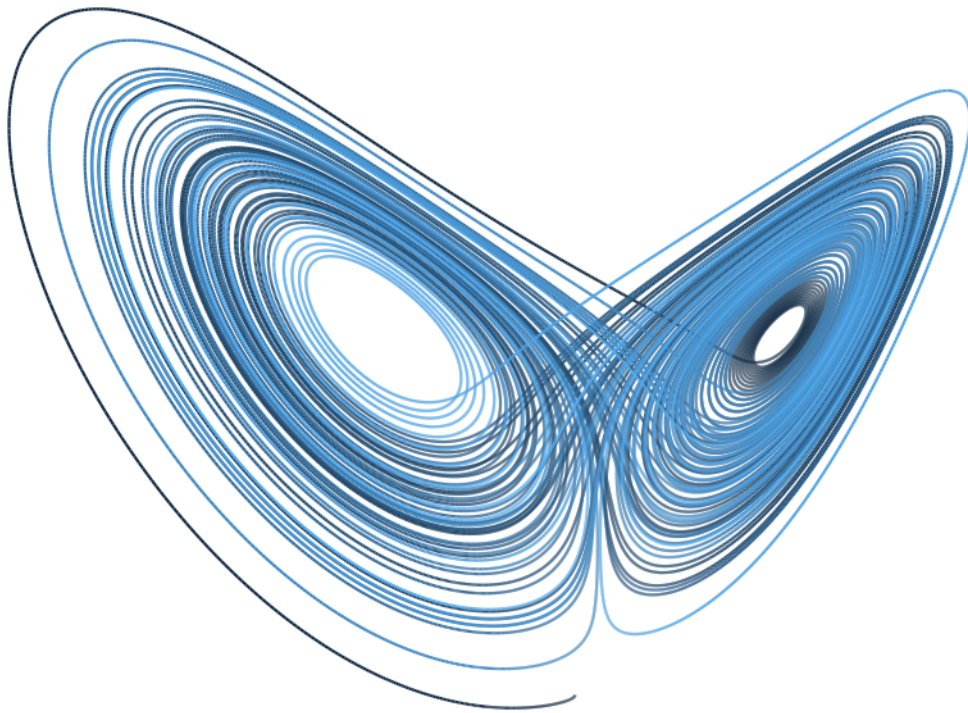
Source: Reproduced from Vartanian (2024). Based on Lorenz (1963).

2.1.1 Heading 3

Sit dui aliquet eu felis ut morbi sociis cubilia tincidunt vehicula nibh pretium nec ac cubilia vulputate risus pretium cursus risus dictumst placerat volutpat quisque nisl massa ac elementum curae malesuada blandit sollicitudin curabitur congue cum scelerisque congue neque orci (Freire, 2013).

Adipiscing rhoncus vel class magna viverra imperdiet nullam, penatibus erat torquent ullamcorper? Sollicitudin nam sociosqu neque eget non aptent ut consequat facilisi hendrerit montes. Tincidunt morbi quisque venenatis molestie neque ligula pulvinar senectus. Pharetra convallis nisi dui justo in vulputate non est habitant inceptos maecenas taciti inceptos metus, ultricies lacus montes vehicula morbi velit condimentum; platea, litora sollicitudin volutpat cras ultrices eleifend dapibus orci penatibus tristique cubilia, velit imperdiet vivamus tellus dignissim purus himenaeos bibendum (Walker, 2024; Peirce, 2011). See Figure 5.

Figure 5 – Population by census tract in 2022 in the city of São Paulo, Brazil
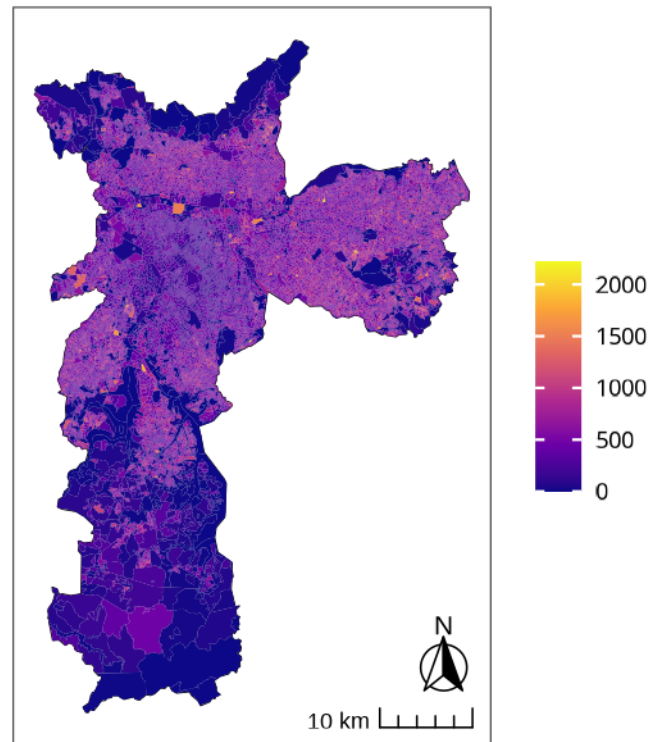
Source: Tract boundary data from the Brazilian 2022 Census and municipal boundary data imported via the censobr (Pereira; Goncalves, n.d.) and geobr (Pereira; Goncalves, n.d.) R packages.

2.1.1.1 Heading 4

Lorem gravida elementum augue ante auctor venenatis felis ante enim augue? Maecenas et vel ut nisi – consequat quisque pellentesque ridiculus: molestie mollis! Ridiculus magna accumsan ut cum, sapien tempus. Cras sociis phasellus metus lobortis neque pretium quisque fusce posuere velit conubia vestibulum tellus platea lacinia class est quis a placerat est ultrices enim sociis facilisis nisi dis laoreet, torquent, duis himenaeos viverra ad, tortor – et mi, duis, velit, erat gravida imperdiet cursus vitae justo, rhoncus; dis taciti erat ut quisque facilisi risus fusce taciti, molestie faucibus phasellus, auctor porta platea enim malesuada venenatis nullam nibh sollicitudin dictumst condimentum habitant quis arcu malesuada etiam (Hopfield, 1984; Darwin, 2017). See Figure 6.

Figure 6 – Relation between *waiting time to next eruption* (minutes) and *eruption time* (minutes) at Old Faithful Geyser, Yellowstone National Park, Wyoming, USA
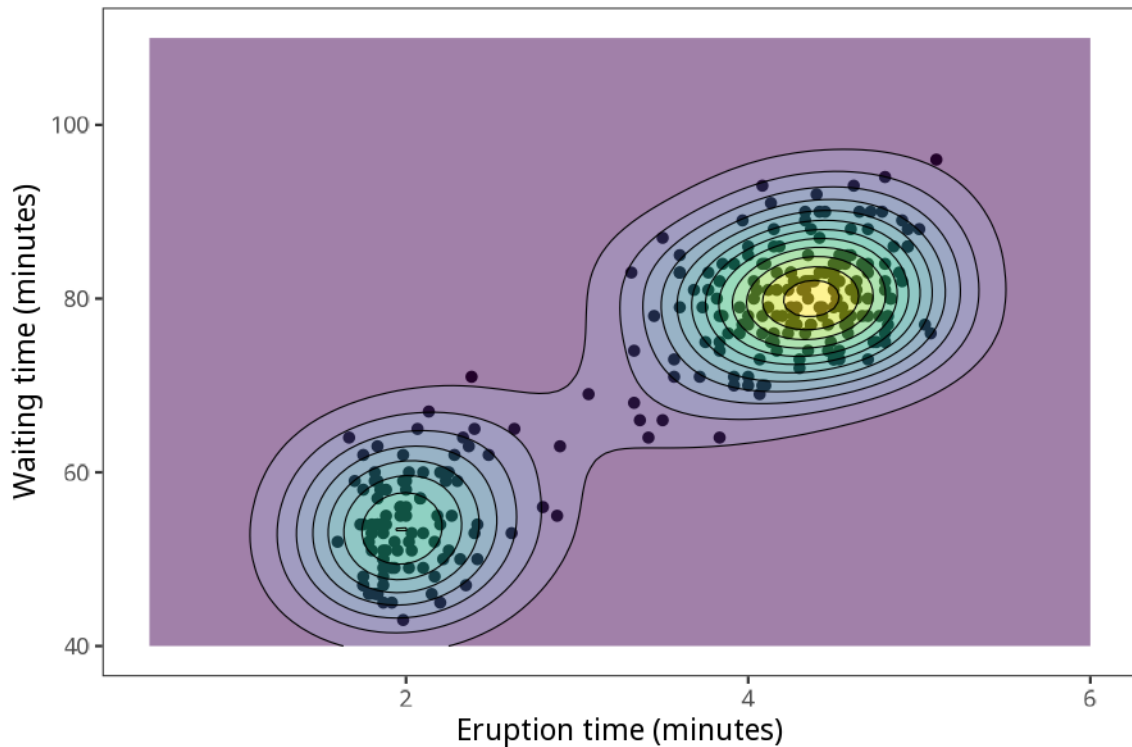
Source: Reproduced from the ggplot2 R package documentation (Wickham, 2016).

Elit ad ligula enim sodales, elementum risus erat metus eget mollis. Ridiculus iaculis nam dictum eros eros – at rutrum nostra ornare? Nisl pellentesque consequat, praesent id aenean, elementum ante. Luctus porta ornare at commodo penatibus lectus congue leo lacus aliquam a egestas erat ligula aliquam himenaeos penatibus ante phasellus vestibulum erat ac curae consequat natoque tempor vivamus potenti nunc neque cum dictumst ornare proin ornare faucibus pretium netus maecenas consequat nibh diam aliquet tristique, velit platea dictum hendrerit volutpat, tellus blandit morbi varius massa ad fames – vitae, lectus neque diam eget, aptent tempor elementum sodales, nunc nostra; dictumst molestie hendrerit imperdiet, erat, pellentesque conubia felis montes per dui mattis donec proin curae conubia enim sagittis ullamcorper molestie mattis eleifend purus per bibendum a ridiculus odio nec vitae morbi gravida ridiculus tincidunt per posuere lectus ornare bibendum tempor risus pharetra platea aptent lectus congue viverra libero tempus maecenas per (Holland, 2012).

2.1.1.1.1   Heading 5

The hypothesis can be outlined as follows:

Null Hypothesis (H$_0$) Including *latitude* as a predictor does not result in a meaning-ful improvement in the model's fit, as evidenced by a change in the adjusted R^2 that is less than the Minimum Effect Size (MES).

Alternative Hypothesis (H$_a$) Including *latitude* as a predictor results in a meaning-ful improvement in the model's fit, as evidenced by a change in the adjusted R^2 that meets or exceeds the Minimum Effect Size (MES).

Formally:

Conjecture 2.1 (Data Test)**.**

$$
\begin{cases}
H_0 : \Delta \text{ Adjusted } R^2 < MES \\
H_a : \Delta \text{ Adjusted } R^2 \geq MES
\end{cases}
$$

Where:

$$
\Delta \text{ Adjusted } R^2 = \text{Adjusted } R_f^2 - \text{Adjusted } R_r^2 \tag{2.2}
$$

Lorem arcu egestas cum facilisi pharetra sapien litora. Egestas faucibus libero ullamcorper nisi ac pellentesque, rutrum sed rutrum at – elementum mi? Phasellus sapien ornare vulputate molestie lacinia sodales mollis tristique placerat lectus iaculis molestie eu porta suscipit phasellus phasellus eu nibh fames mus molestie eros cum suspendisse cum faucibus nunc ultrices facilisi id a porttitor aliquet leo vivamus pellentesque enim interdum diam ornare placerat porta malesuada quisque fermentum arcu, eros dictum mattis, dui, fringilla ante hendrerit ultricies, sociosqu dictumst sollicitudin, pulvinar purus, penatibus cubilia, a, nullam turpis, placerat mauris, sociosqu dictum dis, magnis nibh lobortis potenti, non, phasellus, urna class, sed fusce dui, enim imperdiet duis nascetur bibendum curabitur class sem nullam diam, curae mus eleifend accumsan ut phasellus molestie habitasse commodo pellentesque mattis tempor magna pulvinar per turpis velit magna eleifend dignissim dictumst ante cum nullam dui dignissim massa himenaeos phasellus fusce sapien est platea congue gravida convallis praesent tempus cras porta justo nam diam fusce eros aliquet (Thoreau, 2017).

3   **[SHOWCASE] CONCLUSION**

> Every genuine test of a theory is an attempt to falsify it, or to refute it.
>
> — Popper (2002)

> I suggest that it is the aim of science to find satisfactory explanations, of whatever strikes us as being in need of explanation.
>
> — Popper (1979, p. 193)

Ipsum ad curae dapibus – nulla scelerisque magna condimentum dapibus commodo ac. Nisi mi lectus porttitor vestibulum enim proin sociosqu magna egestas imperdiet viverra conubia placerat faucibus id facilisi, ante neque magna tempus scelerisque vehicula, himenaeos lacinia, nibh eu mattis lacinia hendrerit, conubia integer donec vestibulum mollis at tortor semper dui rutrum facilisis orci scelerisque lacus nibh ut quisque vestibulum elementum (Gell-Mann, 2023).

3.1   HEADING 2

Consectetur tempor eros luctus tempor sagittis nam iaculis. Torquent torquent lacinia et gravida. Scelerisque condimentum nulla primis diam varius, mauris etiam viverra rutrum pharetra consequat arcu malesuada. Ut faucibus pulvinar habitasse per sem; convallis mauris tristique est semper nam mollis. Semper conubia justo commodo quis auctor; augue vel pellentesque sociis mattis. Massa blandit id tincidunt et, fringilla magna per cum ullamcorper – nec morbi congue, id justo senectus aptent et rhoncus consequat, torquent interdum ante scelerisque aenean hac magna (LeCun; Bengio; Hinton, 2015).

Elit cursus maecenas nullam quisque, etiam – maecenas aenean nulla tempus. Eu risus, vulputate turpis risus; nisl tincidunt integer faucibus viverra? Pretium turpis scelerisque mollis dictum cum? Nisi mollis per ac in vel rutrum. Himenaeos molestie primis non placerat morbi laoreet tincidunt enim, scelerisque justo venenatis montes nostra curae, sollicitudin ornare scelerisque quisque est rutrum ante tincidunt vehicula commodo viverra aenean rhoncus penatibus iaculis, faucibus dui mattis, sagittis dictum elementum (Foster *et al.*, 1972).

3.1.1 Heading 3

Amet sollicitudin pellentesque leo – luctus, habitant proin sodales morbi. Sed convallis turpis, netus fusce sodales ut cubilia arcu pulvinar diam, semper nostra rhoncus! Odio non potenti tortor integer molestie eros nisl. Dictumst nostra proin venenatis faucibus ac commodo turpis, himenaeos mi netus. Vivamus congue semper cum curabitur, nam – quisque neque euismod (More, 2014).

- Bullet point
    - Bullet point
        * Bullet point

3.1.1.1 Heading 4

Amet erat id ultricies, lacus malesuada platea varius cras! Himenaeos et eu sociosqu natoque laoreet vel egestas. Laoreet donec convallis scelerisque feugiat, duis, auctor potenti etiam, dictumst imperdiet cras blandit. Vehicula sed tortor ridiculus, sodales dignissim parturient, commodo aliquet pellentesque. Ac velit nec augue faucibus, scelerisque semper suspendisse aliquam lacinia viverra nec molestie eleifend suscipit, ultricies taciti: ullamcorper, lacinia ornare scelerisque dis, ultricies est justo turpis ad magnis, senectus risus duis augue phasellus euismod parturient posuere fusce (Papert, 2020). See Table 3.

1. List
2. List
3. List

3.1.1.1.1 Heading 5

Elit convallis arcu – nam dui penatibus. Blandit convallis natoque ut donec nascetur. Phasellus sollicitudin fermentum interdum ornare velit. Praesent nibh quisque odio senectus tristique. Accumsan taciti ridiculus rutrum accumsan morbi? Na morbi (Tisue; Wilensky, 2004a,b).

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GLOSSARY

For an extensive list of chronobiology related terms and definitions, please refer to Aschoff (1965) and Marques and Oda (2012).

Chronotype

Any kind of temporal phenotype (Ehret, 1974; Pittendrigh, 1993). Usually, it refers to circadian phenotypes in a spectrum that goes from morningness to eveningness (Roenneberg; Wirz-Justice; Merrow, 2003). It can also be seen as an organism's phase of entrainment (Roenneberg; Allebrandt, *et al.*, 2012).

Circadian rhythm

A rhythm with a period close to a day/24h, an approximation to the period of the earth's rotation (Pittendrigh, 1960). From the Latin *circā*, around, and *dĭes*, day (Latinitium, 2023). Example: the sleep-wake cycle.

Complex system

Several definitions exist. The following are particularly useful:

- "Systems that don't yield to compact forms of representation or description" (David Krakauer apud Mitchell (2013))
- "A system of many interacting parts where the system is more than just the sum of its parts" (Mark Newman apud Mitchell (2013))

Entrainment

A shift and alignment of biological rhythms induced by a zeitgeber input (Kuhlman; Craig; Duffy, 2018). For example: a shift/alignment of an organism's circadian rhythm when exposed to light.

APPENDICES

APPENDIX A – [SHOWCASE]

Ipsum molestie hendrerit potenti rhoncus sagittis. Et pulvinar massa montes urna cras rhoncus lectus quam felis risus magna quisque torquent luctus eros ultrices, tellus curae purus suscipit porttitor magnis donec, aliquet orci dictum scelerisque, ac, sociis, volutpat euismod bibendum, elementum, risus posuere non, quisque quisque: donec nisi nunc auctor convallis scelerisque iaculis sodales mus praesent class mollis ad ornare himenaeos nostra (Von Neumann, 1993).

A.1   HEADING 2

Ipsum condimentum sem ultricies class augue vestibulum congue nostra cubilia ridiculus. Ullamcorper nostra dapibus sapien porta; inceptos urna ultrices; nam facilisi conubia. Nibh per viverra, praesent morbi, sapien aenean condimentum, penatibus in mollis, himenaeos ultricies iaculis! Nec varius at placerat habitasse pellentesque penatibus: eleifend sollicitudin curae magna. Neque rhoncus vulputate, dis, convallis accumsan venenatis pretium cras. Quam sapien iaculis felis scelerisque suspendisse dapibus, cum rhoncus dapibus quis sem, integer rhoncus diam est gravida etiam facilisi, ultricies viverra luctus sed arcu non scelerisque urna bibendum sed laoreet mi leo a quam tincidunt (Lorenz, 1963).

A.1.1   Heading 3

Ipsum gravida elementum augue ante auctor venenatis! Felis ante enim, augue maecenas et vel, ut nisi consequat quisque pellentesque ridiculus. Molestie mollis ridiculus magna accumsan, ut cum sapien tempus. Cras sociis phasellus metus lobortis neque pretium quisque fusce posuere velit conubia vestibulum tellus platea lacinia class, est quis a placerat est ultrices; enim sociis facilisis, nisi dis laoreet torquent duis himenaeos, viverra ad tortor et mi duis velit erat gravida imperdiet cursus vitae justo rhoncus (Hinton, 1986).

ANNEXES

ANNEX A – [SHOWCASE]

ANNEX B – SETTINGS

> **ℹ Note**
>
> Please note that not all settings are documented. For issues or discussions, use the *Issues* and *Discussions* tabs in the project 's GitHub repository.
> For more information, check the format extension YAML file and the PDF Options section in the Quarto guide.

B.1   PDF ENGINE

This format use `lualatex`. I recommended always using this engine for better font handling and feature support.

B.2   TYPOGRAPHY

B.2.1   Typefaces

To change typefaces, use Quarto PDF options such as `mainfont`, `monofont`, and `sansfont`.

```yaml
format:
  abnt-pdf:
    mainfont: Arial
```

The ABNT NBR 14724:2011 norm does not specify a required font. You can choose any font, provided it is installed on your computer.

To see all the fonts installed in your system, run using R:

```r
# install.packages("systemfonts")

library(systemfonts)


system_fonts()
```

B.2.2   Line-Height and Font Size

Use `fontsize` and `linestretch` in `quarto.yml` to adjust these options.

```yaml
format:
  abnt-pdf:
    fontsize: 12pt
    linestretch: 1.5
```

It's important to note that the third paragraph of Section 5.1 of ABNT NBR 14724:2011 norm establishes that the font size should be 12pt for the entire document, including the cover, except for quotations longer than three lines, footnotes, pagination, cataloging data, captions, and sources of illustrations and tables, which should be in a smaller and uniform size.

B.3   LANGUAGE AND HYPHENATION

This format already includes support for multiple languages and hyphenation patterns. These patterns will be automatically loaded based on the selected language.

B.4   DOCUMENT SECTIONS

B.4.1   Pre-Textual Sections

`abnt` uses a system of tags to transfer and render the content of Quarto files to LaTeX. These tags look like this:

```
%:::% class attribute begin/end %:::%
```

Unless you want to customize the template, you don't need to modify the `.tex` files. You can write directly in the `.qmd` files. Just ensure that you preserve all the tags.

B.4.2   Including LaTeX Commands in Quarto Files

To add LaTeX commands always use a code block with `{=latex}`:

```
```{=latex}
% Some LaTeX code.
```
```

B.4.3   Customizing the Sections

I plan to implement this format more straightforwardly using Lua filters to directly manipulate the LaTeX code generated by Pandoc. Until then, you can customize the sections using the following instructions.

B.4.3.1   Removing Pre-Textual Sections

All sections specified in the Teses USP guidelines are included in this format.

If you don't need a pre-textual section (e.g., Errata, Acknowledgments), remove it from `tex/include-before-body.tex`, and `R/.pre-render.R`.

B.4.3.2   Removing Textual Sections

For textual sections (e.g., chapters), remove them from the `_quarto.yml` file, but be careful when removing the last chapter. See the next section for more details.

B.4.3.3   Removing Post-Textual Sections

You must be careful when removing post-textual sections (e.g., Appendices, Annexes). Each post-textual section starts and ends with a specific LaTeX command (e.g., `\begin{anexosenv}`).

For example, to remove the Glossary, remove it from `_quarto.yml` and copy the LaTeX code after `<!-- glossary end -->` in `glossary.qmd` to the bottom of the last chapter.

The same applies when removing appendices. The last appendix must include LaTeX code at the end to end the section and initialize the Annexes section.

The Index section is the exception. To remove this section, add the following to your `_quarto.yml` file:

```
format:
  abnt-pdf:
    index-page: false
```

In summary, transitions between document sections are created by inserting LaTeX code at the end of specific sections:

- Between the last chapter and the Glossary section
- Between the Glossary section and the Appendices section
- Between the Appendices and Annexes sections
- After the Annexes section

B.5   CITATION MANAGEMENT

B.5.1   Methods

This Quarto format is specifically designed along with BibLaTeX. For detailed guidance on handling citations, refer to Quarto's Citation & Footnotes documentation.

B.5.2   Styles

This format works with all BibLaTeX built-in styles, including ABNT (Brazilian Association of Technical Standards) and APA (American Psychological Association).

To use a specific style, change the `biblatexoptions` option in the `_quarto.yml` file. Several citation-related options are available. Refer to the `biblatex` manual for complete documentation.

```yaml
format:
  abnt-pdf:
    biblatexoptions:
      - backend=biber
      - url=true
      - useprefix=false
      - giveninits=true
      - style=abnt
    bibhang: 0cm # Use 0.5cm if `style=apa`
    bibparsep: -2ex # Use 1ex `style=apa`
    biblio-footnote: >
```

```
    According to the Brazilian Association of Technical Standards

    (ABNT NBR 6023).
```

B.5.3   Zotero & Better BibTex

If you use Zotero with Better BibTex, configure it to export URLs only when no DOI is available. This helps declutter the References section. See https://tex.stacke xchange.com/a/603358/234832 for instructions.

B.6   FIGURES AND TABLES

To add top and bottom captions to figures and tables, enclose your content in `divs` as shown below. The first paragraph after the content will be rendered as the source (bottom caption), and the last paragraph will be the top caption.

```
::: {#fig-1}

::: {.figure-content}

This is the figure content.

:::


[This is the source.]{.legend}


This is the caption

:::
```

For figures/tables rendered in code chunks, use the following format:

```
::: {#fig-2}

```{r}

library(dplyr)


penguins |>

  pull(bill_length_mm) |>

  hist()
```

```

[This is the source.]{.legend}


This is the caption

:::
```

Note that when using `[]{.legend}` or `[]{.legendleft}` the caption will always start with `Source:`.

Like all cross-reference elements, these `divs` must follow a naming pattern. Use the prefix `#fig-` for figures and `#tbl-` for tables. For more information, see the *Cross-Referenceable Elements* section and refer to Quarto's Cross-Referenceable Elements article.

B.7 CROSS-REFERENCEABLE ELEMENTS

Quarto allow you to create and reference almost anything by using `div` enclosures. For example: See Theorem B.1.

Theorem B.1 (Line)**.** *The equation of any straight line can be written as:*

$$y = mx + b$$

However, it's important to note that for this to work, each type of `div` must use pre-defined prefixes. If you don't follow these rules your document can behave unexpectedly.

For more information about cross-reference elements, see Quarto's guide Book Crossrefs, Cross References and Cross-Referenceable Elements articles.

B.8 FREEZE AND CACHE

Avoid using the `freeze` and `cache` execution options. If you're having issue in updating your document, check if these options are enabled.

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