UNIVERSITY OF CALIFORNIA
SANTA CRUZ

A SUPER AWESOME TITLE OF EXCELLENT WORK

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

MATHEMATICS

by

Your name

June 2023

The Dissertation of Your name
is approved:

Professor Chair, Chair

Professor 1

Professor 2

Peter Biehl
Vice Provost and Dean of Graduate Studies

Contents

List of Figures v

List of Tables vii

Abstract viii

Dedication ix

Acknowledgments x

I. Sample 1

1. Sample Chapter 3

1.1. Font 3

1.2. Layout 3

1.3. Sections 4

1.4. Table and Figure 4

1.5. Math notations 5

1.6. Math environments 7

A. Illustrate **9**

A.1. The next pages show layout 9

References 13

List of Figures

1.1. The banana slug 4

List of Tables

1.1. Table to test captions and labels. 4

Abstract

A super awesome title of excellent work

by

Your name

This is abstract!

Yes. Abstract.

For whatever

Acknowledgements

Thanks

Part I.

Sample

Chapter 1.

Sample Chapter

§ 1.1. Font

Fonts are in file `preamble/font`.

- Text use mainly PS Type 1 font based on Times. This is done by `newtxtext`.
- Math fonts: use package `newtxmath` and `mathalpha`. I minimize the package usage, for instance, no `amssymb` (as the symbols are already in `newtxmath`).

§ 1.2. Layout

Preambles for layout (in file `preamble/layout`):

- For page: use package `geometry`
- For header and footer: use package `scrlayer-scrpage`
- For line spacing: use package `setspace`

- For footnote[***]: use package `footmisc`

§ 1.3. Sections

In file `preamble/section`.

- chapter prefix: true
- section prefix: §
- headings: font=standardclasses, size=normal

§ 1.4. Table and Figure

Here is a table (Table 1.1) and a figure (Fig. 1.1):

cell1	cell2	cell3
cell4	cell5	cell6
cell7	cell8	cell9

Table 1.1.: Table to test captions and labels.

Figure 1.1.: The banana slug

*This is one footnote
**This is another footnote.

§ 1.5. Math notations

Font families:

- ABC: $ABCDEFGHIJKLMNOPQRSTUVWXYZ$
- abc: $abcdefghijklmnopqrstuvwxyz$
- bold italic ABC: $\boldsymbol{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- bold italic abc: $\boldsymbol{abcdefghijklmnopqrstuvwxyz}$
- bold ABC: **ABCDEFGHIJKLMNOPQRSTUVWXYZ**
- bold abc: **abcdefghijklmnopqrstuvwxyz**
- sans-serif ABC: $\mathsf{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- sans-serif abc: $\mathsf{abcdefghijklmnopqrstuvwxyz}$
- blackboard bold ABC: $\mathbb{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- blackboard bold abc: $\mathbb{abcdefghijklmnopqrstuvwxyz}$
- calligraphic ABC: $\mathcal{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- script ABC: $\mathscr{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- script abc: $\mathscr{abcdefghijklmnopqrstuvwxyz}$
- fraktur ABC: $\mathfrak{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$
- fraktur abc: $\mathfrak{abcdefghijklmnopqrstuvwxyz}$

See the effects of math font setting:

- numbers: 0123456789
- Greeks upper: $\Gamma, \Delta, \mathit{\Sigma}, \Theta, \Lambda, \Xi, \Pi, \Sigma, \Upsilon, \Phi, \Psi, \Omega$
- Greeks lower: $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta, \iota, \kappa, \lambda, \mu, \nu, \xi, \pi, \rho, \sigma, \tau, \upsilon, \phi, \chi, \psi, \omega$
- Greek var: $\mathit{\Gamma}, \mathit{\Delta}, \mathit{\Theta}, \mathit{\Lambda}, \mathit{\Xi}, \mathit{\Pi}, \mathit{\Sigma}, \mathit{\Upsilon}, \mathit{\Phi}, \mathit{\Psi}, \mathit{\Omega}, \varepsilon, \vartheta, \varpi, \varrho, \varsigma, \varphi$
- uvw v.s. nu omega: u, v, w, ν, ω
- yg f and rho: y, g, f, ρ
- special letters: $\aleph, \beth, \gimel, \daleth, \eth, \Im, \Re, \imath, \jmath, \Bbbi, \Bbbj, \ell, \hbar, \hbar, \wp, \lambda, \lambda, \Bbbk, \mathbb{Z}$
- special notations: Å, $\partial, \nabla, \infty, \forall, \exists, \sharp, \flat, \natural, \dagger, \ddagger, \complement, \mho, \emptyset, \varnothing, ©$
- binary relations: $\in \ni \notin \not\ni \subseteq \supseteq \subseteq \supseteq \subset \supset \subsetneq \supsetneq \sqsubset \sqsupset \lhd \rhd \unlhd \unrhd \leq \geq \leqslant \geqslant \ll \gg \lessgtr \gtrless \bowtie \bowtie \vdash \dashv$
- equivs: $\equiv \cong \sim \simeq \approx \asymp \doteq \neq, :==: \Longleftrightarrow ::$

Some macros:

- Delimiters: $\left|\frac{a}{y}\right|, \left\|\frac{a}{y}\right\|, \left\langle\frac{a}{y}\right\rangle, \left(\frac{a}{y}\right), \left[\frac{a}{y}\right], \left[\!\left[\frac{a}{y}\right]\!\right], \left\{\frac{a}{y}\right\}, \left\lceil\frac{a}{y}\right\rceil, \left\lfloor\frac{a}{y}\right\rfloor, \left\langle\frac{a}{y}\right|, \left|\frac{a}{y}\right\rangle, :XYZ:$
- Sets: $\left\{ \langle express \rangle \;\middle|\; \begin{array}{c} \text{condition 1,} \\ \text{condition 2} \end{array} \right\}$ and $\langle \langle generators \rangle \mid \langle relations \rangle \rangle$
- Pairings: $\langle f \mid X \rangle, \langle f, X \rangle, (f, X)$.
- Fun: $\mathrm{Fun}_{sub}^{sup}\left(\frac{1}{2}\right)$, $\mathsf{G}(R)$, $\mathbf{Ab}$, $\mathcal{O}(U)$
- Notations: $\mathbb{NZQRCFKTDWMAV01}$

- Notations: $|0\rangle, \mathbb{G}_{\mathrm{m}}, \mathbb{G}_{\mathrm{a}}, \mathcal{O}, o, \mathscr{O}, \mathbf{O}(x)$
- Supscript: $A^{\mathsf{H}} A^{\intercal} A^{\perp} A^{\perp\!\!\!\perp} A^{\vee} A^{\times} A^{\circ}$
- Accents: $\vec{u}\ \overrightarrow{AB}\ \overrightarrow{AB_x}\ \overline{AB}\ \widehat{AB}\ \widetilde{AB} \dot{x} \ddot{x} \dddot{x} \bar{\bar{x}} \hat{\hat{x}} \tilde{\tilde{x}} \bar{\bar{x}} \hat{\hat{x}} \tilde{\tilde{x}} \hat{\hat{x}}$

Test your macros (they are in `preambles/user-notations`):

- $\cong, A^{\vee}, A^{\mathrm{op}}, \left[\begin{smallmatrix} a \\ b \end{smallmatrix}\right], \mathbf{u}$
- $x_0, \cdots, x_n, x_0 + \cdots + x_n, x_0 \cdot \cdots \cdot x_n$
- $\mathscr{A}, {}^{v}\mathscr{A}, \mathscr{B}, {}^{v}\mathscr{B}, {}^{v}\mathbb{A}, {}^{v}\mathcal{C}, {}^{v}\mathcal{F}, {}^{v}\Phi, {}^{v}\Sigma, {}^{v}\mathcal{H}, {}^{v}W, {}^{v}\alpha, {}^{v}\nu, {}^{\intercal}f, {}^{v}f, {}^{v}C, {}^{v}F, {}^{v}W, {}^{v}X, \mathcal{I}$
- $\mathrm{d}, \Delta, \Sigma, \twoheadrightarrow, \hookrightarrow$

§ 1.6. Math environments

Should be defined in `preambles/envs`

Theorem 1.6.1. *bla bla*

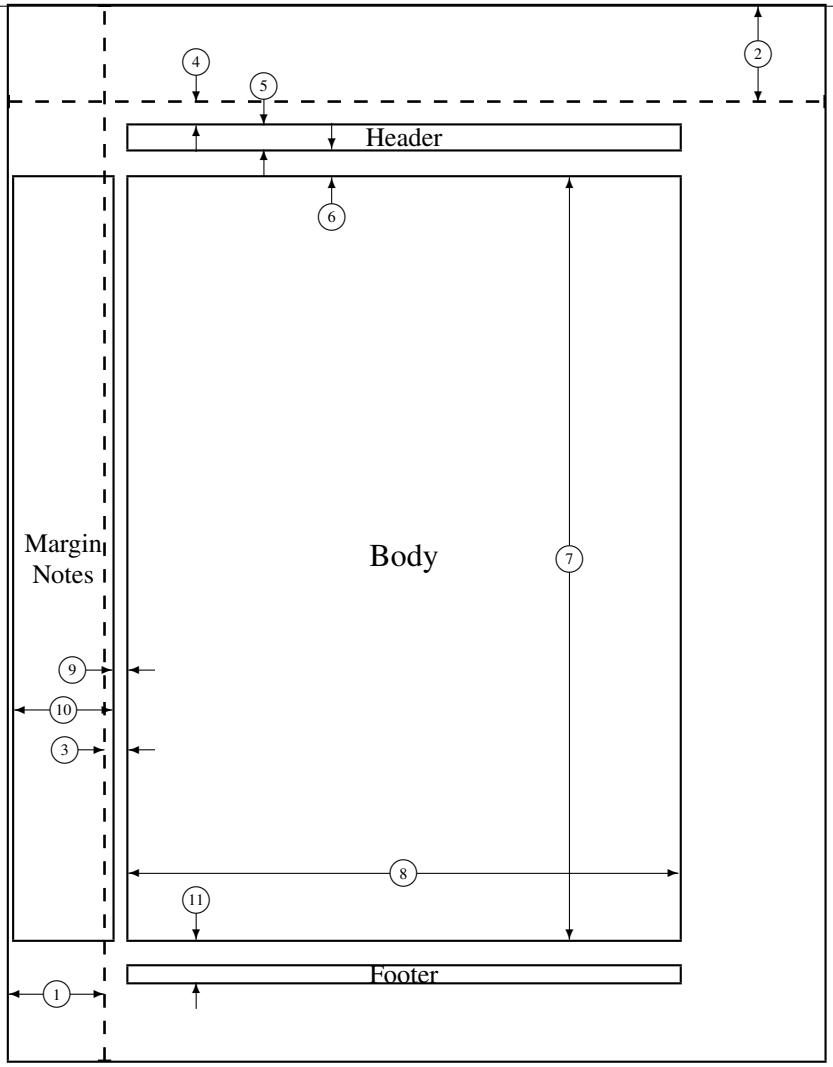
$$expression$$

Proof. bla □

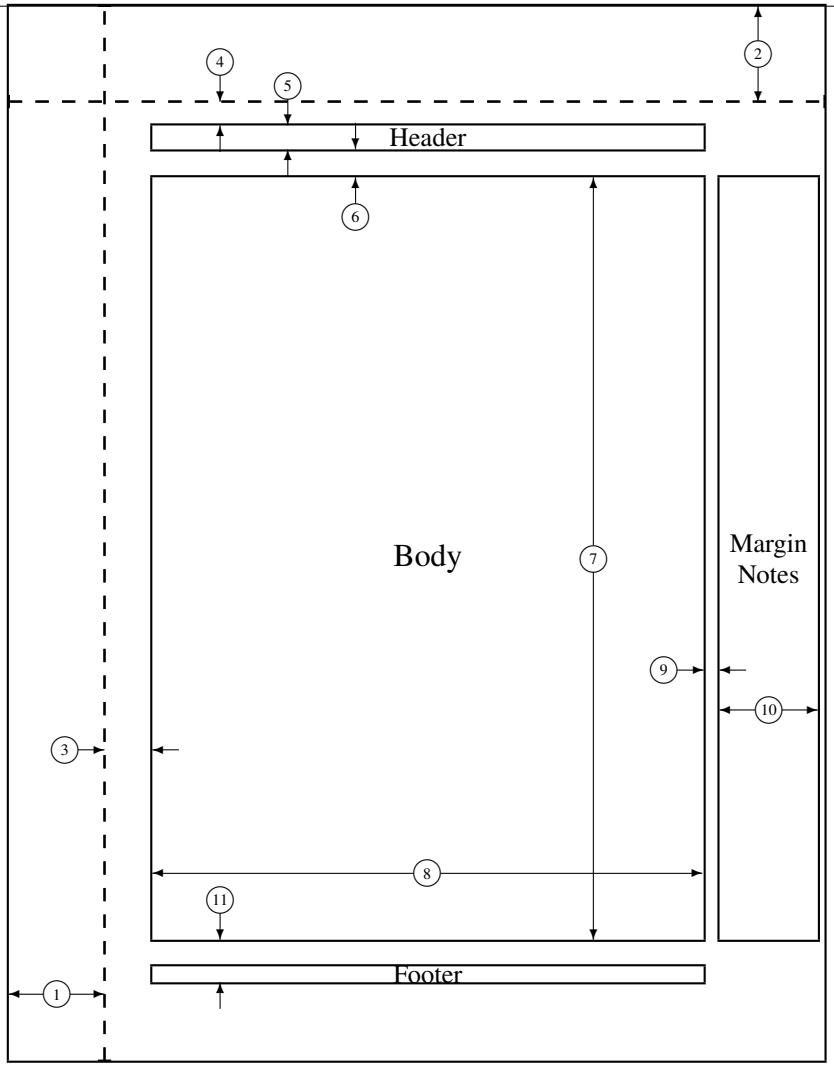
Appendix A.

Illustrate

§ A.1. The next pages show layout



1	one inch + \hoffset	2	one inch + \voffset
3	\evensidemargin = 18pt	4	\topmargin = 18pt
5	\headheight = 18pt	6	\headsep = 21pt
7	\textheight = 574pt	8	\textwidth = 415pt
9	\marginparsep = 12pt	10	\marginparwidth = 74pt
11	\footskip = 32pt		\marginparpush = 6pt (not shown)
	\hoffset = 0pt		\voffset = 0pt
	\paperwidth = 614pt		\paperheight = 794pt



1	one inch + \hoffset	2	one inch + \voffset
3	\oddsidemargin = 36pt	4	\topmargin = 18pt
5	\headheight = 18pt	6	\headsep = 21pt
7	\textheight = 574pt	8	\textwidth = 415pt
9	\marginparsep = 12pt	10	\marginparwidth = 74pt
11	\footskip = 32pt		\marginparpush = 6pt (not shown)
	\hoffset = 0pt		\voffset = 0pt
	\paperwidth = 614pt		\paperheight = 794pt

Bibliography

[1] Jeffrey D. Adler, *Refined anisotropic K-types and supercuspidal representations*, Pacific J. Math. **185** (1998), no. 1, 1–32.

[2] Jeffrey D. Adler and Stephen DeBacker, *Some applications of Bruhat-Tits theory to harmonic analysis on the Lie algebra of a reductive p-adic group*, Michigan Math. J. **50** (2002), no. 2, 263–286.

[3] Dan Barbasch and Allen Moy, *A new proof of the Howe conjecture*, J. Amer. Math. Soc. **13** (2000), no. 3, 639–650.

[4] I. N. Bernstein, I. M. Gel'fand, and S. I. Gel'fand, *Schubert cells, and the cohomology of the spaces G/P*, Uspehi Mat. Nauk **28** (1973), no. 3(171), 3–26 (Russian).

[5] Nicolas Bourbaki, *Lie groups and Lie algebras. Chapters 4–6*, Elements of Mathematics (Berlin), Springer-Verlag, Berlin, 2002. Translated from the 1968 French original by Andrew Pressley.

[6] Siegfried Bosch, Werner Lütkebohmert, and Michel Raynaud, *Néron models*, Ergebnisse der Mathematik und ihrer Grenzgebiete (3) [Results in Mathematics and Related Areas (3)], vol. 21, Springer-Verlag, Berlin, 1990.

[7] Armand Borel, *Sur la cohomologie des espaces fibrés principaux et des espaces homogènes de groupes de Lie compacts*, Ann. of Math. (2) **57** (1953), 115–207 (French).

[8] A. Borel and J.-P. Serre, *Corners and arithmetic groups*, Comment. Math. Helv. **48** (1973), 436–491.

[9] ———, *Cohomologie d'immeubles et de groupes S-arithmétiques*, Topology **15** (1976), no. 3, 211–232 (French).

[10] Armand Borel and Jacques Tits, *Groupes réductifs*, Publications Mathématiques de l'IHÉS **27** (1965), 55–151.

[11] François Bruhat and Jacques Tits, *Groupes réductifs sur un corps local : I. Données radicielles valuées*, Publications Mathématiques de l'IHÉS **41** (1972), 5–251.

[12] ———, *Groupes réductifs sur un corps local : II. Schémas en groupes. Existence d'une donnée radicielle valuée*, Publications Mathématiques de l'IHÉS **60** (1984), 5–184.

[13] ———, *Schémas en groupes et immeubles des groupes classiques sur un corps local*, Bull. Soc. Math. France **112** (1984), no. 2, 259–301.

[14] ———, *Schémas en groupes et immeubles des groupes classiques sur un corps local. II. Groupes unitaires*, Bull. Soc. Math. France **115** (1987), no. 2, 141–195.

[15] A.D.R. Choudary and C.P. Niculescu, *Real Analysis on Intervals*, Springer India, 2014.

[16] Ching-Li Chai and Jiu-Kang Yu, *Congruences of Néron models for tori and the Artin conductor*, Ann. of Math. (2) **154** (2001), no. 2, 347–382. With an appendix by Ehud de Shalit.

[17] Stephen DeBacker, *Homogeneity results for invariant distributions of a reductive p-adic group*, Ann. Sci. École Norm. Sup. (4) **35** (2002), no. 3, 391–422.

[18] ———, *Some applications of Bruhat-Tits theory to harmonic analysis on a reductive p-adic group*, Michigan Math. J. **50** (2002), no. 2, 241–261.

[19] ———, *Parametrizing nilpotent orbits via Bruhat-Tits theory*, Ann. of Math. (2) **156** (2002), no. 1, 295–332.

[20] Jessica Fintzen and Beth Romano, *Stable vectors in Moy-Prasad filtrations*, Compos. Math. **153** (2017), no. 2, 358–372.

[21] Jessica Fintzen, *On the Moy-Prasad filtration*, J. Eur. Math. Soc. (JEMS) **23** (2021), no. 12, 4009–4063.

[22] ———, *On the construction of tame supercuspidal representations*, Compos. Math. **157** (2021), no. 12, 2733–2746.

[23] Paul Garrett, *Buildings and classical groups*, Chapman & Hall, London, 1997.

[24] O. Goldman and N. Iwahori, *The space of* $\mathfrak{p}$*-adic norms*, Acta Math. **109** (1963), 137–177.

[25] Mikhail Gromov and Richard Schoen, *Harmonic maps into singular spaces and p-adic superrigidity for lattices in groups of rank one*, Inst. Hautes Études Sci. Publ. Math. **76** (1992), 165–246.

[26] Steven S. Gubser, Johannes Knaute, Sarthak Parikh, Andreas Samberg, and Przemek Witaszczyk, *p-adic AdS/CFT*, Comm. Math. Phys. **352** (2017), no. 3, 1019–1059.

[27] Yves Guivarc'h and Bertrand Rémy, *Group-theoretic compactification of Bruhat-Tits buildings*, Ann. Sci. École Norm. Sup. (4) **39** (2006), no. 6, 871–920 (English, with English and French summaries).

[28] Hiroaki Hijikata, *On the structure of semi-simple algebraic groups over valuation fields. I*, Japan. J. Math. (N.S.) **1** (1975), no. 2, 225–300.

[29] N. Iwahori and H. Matsumoto, *On some Bruhat decomposition and the structure of the Hecke rings of* $\mathfrak{p}$*-adic Chevalley groups*, Inst. Hautes Études Sci. Publ. Math. **25** (1965), 5–48.

[30] Lizhen Ji, *Large scale geometry, compactifications and the integral Novikov conjectures for arithmetic groups*, Third International Congress of Chinese Mathematicians. Part 1, 2, AMS/IP Stud. Adv. Math., 42, pt. 1, vol. 2, Amer. Math. Soc., Providence, RI, 2008, pp. 317–344.

[31] ———, *Buildings and their applications in geometry and topology*, Differential geometry, Adv. Lect. Math. (ALM), vol. 22, Int. Press, Somerville, MA, 2012, pp. 89–210.

[32] Michael Joswig, Bernd Sturmfels, and Josephine Yu, *Affine buildings and tropical convexity*, Albanian J. Math. **1** (2007), no. 4, 187–211.

[33] Erasmus Landvogt, *A compactification of the Bruhat-Tits building*, Lecture Notes in Mathematics, vol. 1619, Springer-Verlag, Berlin, 1996.

[34] ———, *Some functorial properties of the Bruhat-Tits building*, J. Reine Angew. Math. **518** (2000), 213–241.

[35] Serge Lang, *Algebra*, 3rd ed., Graduate Texts in Mathematics, vol. 211, Springer-Verlag, New York, 2002.

[36] J. S. Milne, *Algebraic groups*, Cambridge Studies in Advanced Mathematics, vol. 170, Cambridge University Press, Cambridge, 2017.

[37] Allen Moy and Gopal Prasad, *Unrefined minimal K-types for p-adic groups*, Invent. Math. **116** (1994), no. 1-3, 393–408.

[38] _____, *Jacquet functors and unrefined minimal K-types*, Comment. Math. Helv. **71** (1996), no. 1, 98–121.

[39] Gopal Prasad, *A new approach to unramified descent in Bruhat-Tits theory*, Amer. J. Math. **142** (2020), no. 1, 215–253.

[40] _____, *Finite group actions on reductive groups and buildings and tamely-ramified descent in Bruhat-Tits theory*, Amer. J. Math. **142** (2020), no. 4, 1239–1267.

[41] Gopal Prasad and Jiu-Kang Yu, *On finite group actions on reductive groups and buildings*, Invent. Math. **147** (2002), no. 3, 545–560.

[42] M. S. Raghunathan, *Principal bundles admitting a rational section*, Invent. Math. **116** (1994), no. 1-3, 409–423.

[43] Guy Rousseau, *Euclidean buildings*, Géométries à courbure négative ou nulle, groupes discrets et rigidités, 2009, pp. 77–116.

[44] Bertrand Rémy, Amaury Thuillier, and Annette Werner, *Bruhat-Tits buildings and analytic geometry*, Berkovich spaces and applications, 2015, pp. 141–202.

[45] _____, *An intrinsic characterization of Bruhat-Tits buildings inside analytic groups*, Michigan Math. J. **72** (2022), 543–557.

[46] Michel Demazure and Alexander Grothendieck, *Schémas en groupes I, II, III, séminaire de géométrie algébrique 3*, Lecture Notes in Math, vol. 151,152,153, Springer-Verlag, Berlin, 1970.

[47] Peter Schneider and Ulrich Stuhler, *Representation theory and sheaves on the Bruhat-Tits building*, Inst. Hautes Études Sci. Publ. Math. **85** (1997), 97–191.

[48] Junecue Suh, *Stable lattices in p-adic representations I. regular reduction and schur algebra*, Journal of Algebra **575** (2021), 192–219.

[49] ———, *Stable lattices in p-adic representations II. Irregularity and entropy*, Journal of Algebra **591** (2022), 379-409.

[50] Jeremy Teitelbaum, *The geometry of p-adic symmetric spaces*, Notices Amer. Math. Soc. **42** (1995), no. 10, 1120–1126.

[51] Jacques Tits, *Buildings of spherical type and finite BN-pairs*, Lecture Notes in Mathematics, Vol. 386, Springer-Verlag, Berlin-New York, 1974.

[52] ———, *Reductive groups over local fields*, Automorphic forms, representations and L-functions, Part 1, 1979, pp. 29–69.

[53] Jiu-Kang Yu, *Construction of tame supercuspidal representations*, J. Amer. Math. Soc. **14** (2001), no. 3, 579–622.

[54] ———, *Bruhat-Tits theory and buildings*, Ottawa lectures on admissible representations of reductive p-adic groups, 2009, pp. 53–77.

[55] ———, *Smooth models associated to concave functions in Bruhat-Tits theory*, Autour des schémas en groupes, 2015, pp. 227–258.

[56] Annette Werner, *Compactifications of Bruhat-Tits buildings associated to linear representations*, Proc. Lond. Math. Soc. (3) **95** (2007), no. 2, 497–518.

[57] ———, *A tropical view on Bruhat-Tits buildings and their compactifications*, Cent. Eur. J. Math. **9** (2011), no. 2, 390–402.