<u>La Libra de Tanĝentia Minora</u>

de Ryan J. Buchanan

Conventions

The “Ethiopic section mark” (**፠**, U+1360) will be used to demarcate the *majorand*, or leading section of a chapter, subbook, etc. For the *minorand*, i.e. subsections and segments, I will put the standard section symbol (§, U+00A7). To cite a specific section, please write, e.g., **፠0§A1** to mean “majorand zero, first section of minorand A.”

In addition, the author will use the following abbreviations:

A-Z	Bulk matter; standard minoranda
Df.	Definition
Rm.	Remark/statement
Pn.	Conjecture; proposition
Lm.	Lemma
Th.	Theorem
Pf.	Proof
Sk.	Sketch of a proof
Wr.	Warning
Q.	Question

Celo de la Libra

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Mathematics is a beautiful artform. Startlingly few people, in considering the general populace, possess the capacity to appreciate both its inventiveness and flexibility, and fewer yet of us, if any, find the greatest delicacies of this restaurant to be truly within our sphere of comprehension.

Like the Australian socialite who has just whiffed the durian, many are keen to turn up their nose and to exit the site where one has strewn outwards the cacophony of their mental facilities, especially where mathematics is concerned. This is because we are inculcated with the idea that math is austere, unfriendly, unwelcoming, and only to do with numbers. To the slightest extent is this true. Yet, to a far greater extent is it so that mathematics is an infinite tapestry of wonder, and poetry.

Poetry is perhaps the best way of framing the following pages, of which there will be hundreds. This is a partial answer to anyone wondering “what this book is.” It may be easier first, however, to say “what this book is not.”

This book is not written by an expert on any singular or plural topic(s); nor is it written to be consumed either by the general public, or any one specialized sector; it is also, arguably, not totally coherent – hence the title, “The Book of Minor Tangents.” As to who it is written for – I can not say precisely; only that it is true that it is for myself, and for you – the reader who has so generously given me an aspect of your life, in this lonely world, to intimately absorb the workings of my mind.

Like the benign chest tumor which has grown into a voluptuous third breast, these words, specifically the typing of them into these volumes, have outgrown the Schizophrenia and idleness of my humdrum life and began to impress themselves upon the caverns of some small world.

At best, this book is a story, and I am the playwright. Facile abstractions take centerpiece, starring as the main characters, and they are underdogs at that. At worst, it is a cornucopia of delusions and maleficent time wasting. Yet, I hope the reader may still find something endearing, or otherwise of value, as if this book were a duck – not quite fit for cuisine, not quite proper as a pet, and yet, still one finds some compulsion to toss crumbs of rye bread towards the webs of its feet.

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Please know that I would not have written something had it not seemed sensible to me in a genuine way at the time it was said – nor would I make statements which I believe are untrue. For this reason, I tried to include some proofs, flawed as they may be.

With that being said, please take the following with a Himalayan pink salt. Illustrious and novel as it may be, it is still but a fanciful getup for the bank that loans its flavors to the common packet of seasoning in a baggy of instant noodles. This book is very much a liberal endeavor; a passion fruit; and so, form over function is the guiding principle here.

Please take care on your adventure, as you travel this long and forsaken path through the murky bogs and the endless abyss; through the deserts and the forests.

Bon voyage; mazel tov.[1]

Addendum: I have not made any effort to edit any of these sections, either in post, or during the writing of any individual majorand; this is essentially a “raw” experience; it is intended to be read as a stream of consciousness. Where any alterations are made outside of this format, it will be *explicit*; for instance, I have written here “addendum,” as I have introduced this matter apart from the original preface which I had written.

This is, firstly because I am lazy, but secondly, because I have chosen to number each phrase and verse *by hand*, and so it would be time-consuming to have to renumber them each and every time I want to rearrange something.

It is a bitter pill to swallow, that no matter how many revisions I could ever make, this book will never be perfect; and so, if it must be imperfect, it will be *authentically* imperfect. Perfection, or something like it, comes with *practice*; and so, it is these pages which bear witness to the

[1] A jaundice of the mind

messiness of my practices. There will be ups; there will be downs; I may always begin a new session again. I try not to repeat myself too much, but I know it is unrealistic to expect that anyone will read *everything* I have to say; so, it is inevitable that I will say things on more than one occasion, in which case any random passersby will not even notice.

Addendum: It was a great temptation of mine to include earlier writing of mine here that has never before been published. I have written somewhat prolifically to myself, and there was a certain point where I'd feel it was a waste not to include these materials. However, it is not worth combing through everything I have written in order to judge something worthy of inclusion. This is a *live show*.

What is the point of rehashing, verbatim, anything I have already penned if I am going to repeat myself anyways, and if I am going to make mistakes anyways? Does that not defeat the purpose of curating what I have done so far, in order to find the most error-free and original pieces? It would be redundant. Everything will emerge yet again, as in the fashion of the great Suffist spiral.

Kio iras ĉirkaŭ, venas ĉirkaŭ.

There were actually times in my life where I had lost writing (and music that I had made) that I considered to be great, and at the time it was very painful to me; I had mourned this writing, and yearned to have it back. It was probably not so great as I perhaps thought. I had struggled to recreate it, stupidly, but I am sympathetic towards myself for feeling this need. At times the idea of writing seemed futile, as there would be no regaining what I had lost.

I see now just how shortsighted this was. The ability to create is *spontaneous*, and *infinitely generative*. It does not matter that everything is bookkept perfectly, and every grain is counted down to the tee. What matters is that one does not forget how to *sew*; so long as one remembers this, the harvest is bountiful, and the reaping never stops.

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Left Kan extension and the highest weight category

♩ **Louis Armstrong - Skokiaan**

§A1 Let $\overline{y}_{pyk}\mathfrak{R}$ be a discrete valuation ring (DVR). Put ηy^{0}_{id} for the identity obtained by pulling back $\overline{y}_{pyk}$ along fiberwise compatible global sections of Shv($\mathbf{Y}$), where for $Shv(\mathbf{Y}) \ni \overline{y}_{pyk}$, there exists a representative generator $\boldsymbol{\varrho}$ in $\mathbf{Y}^{\mathrm{op}}$. Following [R, Lemma 2.2, pg.4], write

$$\mathrm{Lan}_{\mathbf{Y}}(\boldsymbol{\varrho}(\mathbf{Y}^{\mathrm{op}})\heartsuit)^{\#}$$

for the left Kan extension of $Shv(\mathbf{Y})$. Say that it is "right exacting" if $p_{pyk} \simeq y$ for some (p,y) $\in \mathrm{Lan}_{\mathbf{Y}}(\boldsymbol{\varrho}(\mathbf{Y}^{\mathrm{op}})\heartsuit)^{\#}$, and "left exacting" if $p \simeq y_{pyk}$.

§A2 Define a mapping **ClS** from the category of sets to the category of set-like classes, **Cls**, of which **Sets** is a full subcategory. Write by **Map**(**Cls**,**Sets**)$^{\mathrm{op}}$ the ensuing schism of translations between **Cls** and **Sets**$^{\mathrm{op}}$.

§Rm.1 A **urelement** is a degenerate subcategory consisting of a pair of objects $\overline{xy}$ whose closure lies in the empty set[2]. A **strongly inadmissible urelement** is a mapping $\overline{x} \circ \overline{y} \to$ **ClS** which is onto but not one-to-one in **Map**(**Cls**,**Sets**)$^{\mathrm{op}}$.

§Rm.1.1 A set constructor condensed from a class of weakly inadmissible urelements is called an **atom.** In general, the "personality" of atoms (i.e., their operativity) is on par with that of **basic objects.**

[2] Cl(s) ∈ int{∅}, for a non-empty set with more than two subsets.

§Df.1 A ***generator***, **ϱ**, in a category $\mathbf{Y}^{op}$ is said to "**representative**" of its constituent category if there is a surjection **PreGrp**(**ϱ**) → $\boldsymbol{\varrho}^{\#}\in$ **Im**(**Y**).

§Lm.1 $Lan_{Y^{op}}$ preserves finite and productive colimits

§Sk.1 Write $\widehat{\alpha}$ for a terminus $Lan_{Y^{op}}(\alpha)$ which is the target of a set of maps $\mathbf{X_L}(\beta_n) \to Lan_{Y^{op}}(\alpha) \leftarrow \mathbf{X_R}(\beta_m)$ which are simultaneously left- and right-exacting. We have that $\boldsymbol{\Pi}\beta_m\beta_n$ is the derived limit of $\langle\beta|\alpha|\beta\rangle$, and therefore, $\widehat{\alpha} \in \overline{\alpha\beta}$ is the target for a map $\beta_{mn}\beta^{nm} \to$ **Y**. Thus, the pushout of the diagram lies in **Y**, and is commutative up to a choice of initial object in **X**.

Finally, for $X_L\beta\prod_m^n X_R$ one has that the inductive limit **colim**(β,β) is co-equalized[3] by $\beta_q \to \beta_p$ for all q,p. By fixing an additional index h, one has that $h \circ p = h \circ q$ for a succession defined by $h \circ ((p \circ q) \vee (q \circ p)) = \widehat{\alpha}$. This proves that an n-linear map into $Lan_{Y^{op}}$ is arbitrarily productive and colimit preserving, at least in the finite case.

§Rm.2.1 See [L] for an in-depth and fully general proof that Kan extensions preserve finite products.

§Rm.2.2 By [H, def. 1.1], the barycenter of $\widehat{\alpha}$ is a θ-adherent point, and the sequence

$$l \circ t \circ \ldots \circ ((p \circ q) \vee (q \circ p))$$

θ-converges to $cl(colim(\beta_1))$. This is practically meaningless in the case where $\widehat{\alpha}$ is superminimal; i.e., $cl(\widehat{\alpha})=\widehat{\alpha}$, but is of some interest in the continuous case. In the latter, this allows us to prove some nice properties about $\widehat{\alpha}$-points; namely, the intersection $spec(\widehat{\alpha})\cap cl(\beta^{*})$ is non-empty. Further, by definition, $\widehat{\alpha}$ is an accumulation point of the smooth topology derived from

[3] With respect to a set of countable bases

$(X_L\beta\prod_{m}^{n}X_R)^{cont}$. This topology is obtained by procedurally thickening every $\widehat{\alpha}$ by a radius $\varepsilon>0$ until each $\widehat{\alpha},\widehat{\alpha}'$ kiss.

§Rm.3 There is an effective equivalence between the maps

$$\mathbf{X}_{*,*} \to X_L\beta_{\mu\nu}\prod_{\mu}^{\nu}X_R$$

and

$$\mathbf{Map}(\mathbf{Cls},\mathbf{Sets})^{op}$$

for $\nu>\mu$.

§Wr.1 For ν exactly equal to μ, the map condenses to $\mathbf{X} \to \beta\mathbf{X}$, and is essentially the trivial Stone-Ĉech compactification.

§A3 We will write this equivalence as $\mathbf{X}_{<*,*>}{}^{E}\mathbf{Z}$, where $\mathbf{Z}$ abbreviates the right hand side of the map. This condenses to a comma n-category $\mathbf{X}^{\mathbf{n}}\downarrow\mathbf{Z}$.[4] It follows from Giraud's axioms [G], and from **Lm.1** that $\mathbf{X}^{\mathbf{n}}\downarrow\mathbf{Z}$ is a topos.

§A4 Let $\widetilde{g}_c$ denote the centralizer of $\overline{y}_{pyk}\mathfrak{R}$, and put $\eta^c{:=}\eta y^0_{id} \to \mathbf{\Delta}[\widetilde{g}_c]$. Let this be an epimorphic map. By a theorem of Mašulović [**K**, Theorem 2.2], η^c is the Katětov functor, and by lemma 3.9 [ibid], there is a natural retract to an object:

$$\mathbf{x}^{-\mathbf{n}} \in \langle\mathbf{X_L},\mathbf{X_R}\rangle.$$

§Pn.1 The natural retract of

$$\eta^c\mathbf{\Delta}([\widetilde{g}_c])^{\#}$$

is a representative generator.

§Pf.1 Let $\langle\mathbf{X_L},\mathbf{X_R}\rangle$ be denoted by $\mathbf{X}_i$, and $\mathbf{X_i}^{op}$ be the opposite category. Our proof rests on demonstrating that there are a pair of morphisms, $f{:=}{X_i^{op}}^{op} \to \mathbf{X}_i$ and $g{:=}\mathbf{pregrp}(\mathbf{x}^{-\mathbf{n}}) \to (x^{-n})^{\#}$, with $(x^{-n})^{\#}$ lying within the image of $\mathbf{X}_i$. We are free to choose our functor f so that g satisfies injectivity.

[4] For which we may safely write the one-point compactification as $\cap_n\partial_n \to n^{-1}\sim\{*\}$ for the more general case.

Since by **A4**, $\widehat{\alpha}=K\eta^{c}\mathbf{X}_{i}$, we may take the diagonals of the compatibility cone in [**K**, lemma 3.9] and allow them to index every **pro**(x^{-n}). Because **pro**$(x^{-n})=(x^{-n})$, we have that g is an isomorphism, and so it is automatically surjective. Thus, by **Df.1**, $\mathbf{x^{-n}}$ is a representative generator of the chain $\mathbf{x}^{u} \hookrightarrow \mathbf{X}_{*} \hookrightarrow \mathbf{X}_{*'} \hookrightarrow \ldots \hookrightarrow \overline{X}$.

§A5 Write the chain starting with $\mathbf{x}^{u}$, for $u\in\mathbb{Z}/(0-\mathbb{Z})$ and ending with $\overline{X}$ as $\overline{X}^{w}$. We will adopt the disposition that $\overline{X}^{w}$ (see **Th.1**[5]) constitutes the highest weight category of stacks containing co-modules $\mathcal{C},\mathcal{P}$, acting on separable β^{i},β^{j}. We appropriate our definition of a "highest weight module" from [**W**].

§Df.2 A category $\mathfrak{F}$ is called a "highest weight category" if it satisfies the following conditions:

(a). $\beta\coprod_{i}^{j} = \{\overline{ab}\} \in \{\emptyset\} \cup \iota = \mathbf{M}$

(b). For $\boldsymbol{\lambda}>д>0$, **Pull**(Lan_{λ})/**Pull**$(\mathrm{Lan}_{\lambda-д})\cong$**Push**$(\widehat{\lambda - д})$ and

(c). $\cup$**Pull**$_{д}(\boldsymbol{\lambda}-д)^{\flat}$ is convergent with all θ-adherent points of **M**

§Rm.4 It is worth noting that (a)., in *general*, does not have "enough injectives" (in the sense of [**W**]), but does indeed for sufficiently large ι.

§Rm.5 This definition is, on the face of it, at once generalized and simplified. Firstly, we remove the criterion that д=1. Secondly, by introducing left Kan extensions in place of the free variable n, we also allow for a greater explanatory power of the theory of highest weight categories. For instance, we may write:

§Th.1 $\overline{X}^{w}$ is an approximation of the "highest weight category" of $Shv(Y)$^ up to exodromy.

[5] However, this theorem proves a weaker notion of our assumption

§Rm.6 The story involves a bit more subtlety than that, and so we will refine and prove this theorem at a later point; for now, we shall proceed as before.

§A6 Let $\{\mathscr{T}_i\}_{i\in\mathfrak{J}} \subset \overline{X}^{w}$ be a smooth section of a maximal torus, and write **a** for the functor $i_x \cap_\kappa i_{x'} \to \theta\mathbb{P}^n_\kappa$, for some convergent point $\theta \in \overline{X}^{w}_{\mathfrak{J}}$ residing at a smooth section of $\mathscr{T}_i$.

§A7 For $n \lesssim \lambda_0 \lesssim \lambda_1 \lesssim \ldots \lesssim \lambda_{\aleph_1^\omega}$, let there be a character χ which names a subspace $\widehat{\mathbb{P}}|_\chi$ of $\mathbb{P}^n_\kappa$.

§A8 Let $\mathrm{proj}(\partial \mathrm{Sup}(\kappa^m))^+$ be the class of distinguished points lying on the boundary of $\{\mathscr{T}_i\}_{i\in\mathfrak{J}}$ such that $\frac{i}{o} = \frac{1}{2}$. Here, o is taken to mean $\sum_0^\mu r(\vartheta)$, where ϑ is the radius of a ball whose barycenter lies in $\partial\chi$, and μ the number of such balls. Then,

$$i = \{e \in o_k | o_k \in \chi\}.$$

§Df.3 Say that a subspace

$$\pi_0(\mathbb{A}) \simeq B^m_\iota \subseteq B^n_\kappa,$$

where

$$(m \vee \iota) \precsim (n \wedge \kappa)$$

is “characterized by” Γ if it may be written as the intersection of finitely many characters $\Gamma_0, \Gamma_1, \ldots, \Gamma_f$.

§Df.4 Call a sequence of balls $\mathbf{B} := \{b_1, b_2 \ldots b_k\}$ of radius $r(\vartheta) > \varepsilon > 0$ a ***continuum*** if $\mathbf{B} \subseteq r(\vartheta)$, such that the space characterized by $\chi(\varepsilon)$ is representative of the space characterized by χ. We call a given ball of a continuum a *link*.

§A9 The map $\chi(\vartheta \to \varepsilon)$ may be rewritten as $\mu \to \nu$, where $\nu = \mathrm{im}(\mu)$ is the kissing number of the subcontinua $\tilde{\varepsilon} \subseteq \chi(\varepsilon')$. The formula $\pi(\frac{\varepsilon'}{\vartheta})^2$ expresses the number of additional links obtained by taking the compact image of the germs of χ. Thus, the ratio $\frac{i_p}{o_p}$ remains constant for all p.

§A10 With this picture in mind, one can begin to think of objects in the highest weight category as affine translations of subcontinua. Indeed, it is easy to check that if $\partial\chi=\partial\mathrm{Rep}(|\mathfrak{F}|)$, then $\tilde{\varepsilon}$ are simplicial objects in the fundamental Weyl chamber, $\mathscr{W}$. We must then prove an effective equivalence between

$$\mathrm{Map}(\mathscr{W},\mathrm{Proj}(\partial\mathrm{Sup}(\kappa^{m})^{+})$$
$$\text{and}$$
$$\mathrm{Map}(\mathscr{W},\mathrm{ob}(\mathfrak{F})).$$

To do so:

§Pf.2 Let $\eta\mathscr{W}^{0}$ be a lax monoidal functor with access to the full subcategories of $\mathscr{W}$. By **§A7**, $\lim(\chi)$ has cardinality less than or equal to $\aleph_1^{\omega}$ for a suitably chosen ω. Therefore, the points of $\mathrm{Proj}(\partial\mathrm{Sup}(\kappa^{m}))^{+}$ are embedded as a class of regular cardinals of quantity strictly less than $\aleph_1^{\omega}$ which collapses to some point θ.

We want to show that the locus of this collapse is indeed a generic object of $\mathfrak{F}$. We can do so by constructing a category $\mathcal{H}$ whose objects are all retracts of $\mathfrak{F}$, and whose isometries are preserved under pullback and pushout. We than have that $i_x\cap_{\kappa}i_x \simeq \cup\mathbf{Pull}_{д}(\boldsymbol{\lambda}-д)^{\flat}$. Thus, by allowing an effective equivalence of the form $(\boldsymbol{\lambda}\pm д)^{E}(\mu,\nu)$, we have that $f_* \in \mathfrak{F}$ are parameterized by the links of χ.

This satisfies (b.) and (c.) of **Df.2**. To prove (a.), we want to construct an effective equivalence $\iota^{E}A$ such that ι is a non-trivial element of $\mathrm{Proj}(\partial\mathrm{Sup}(\kappa^{m}))$.

Assume that there is no such equivalence. Then, A must consist purely of a urelement, and thus it does not belong to $\mathcal{H}$. This contradicts **§A10**, because no geometric realization of A exists.

This proves our statement.

§Pn.2 Suppose $\pi_{I}(\mathrm{Lan}_{\chi}(\kappa(\chi^{\mathrm{op}})))^{\flat}$ is totally disconnected as in [**A**, def 1.1.2]. Then, there is some filterbase J ⊆ I for which the monomorphism $|\mathfrak{F}|\hookrightarrow\pi_{I}(\mathrm{Lan}_{\chi}(\kappa(\chi^{\mathrm{op}})))^{\flat}$ is left-exacting, and $\mathrm{Lan}_{\chi}(\kappa(\chi^{\mathrm{op}}))^{\#}$ is a residue of the pro-étale site.

§A11 Specifically, the set of adjoints $\kappa(\chi^{\mathrm{op}}) \to \mathbf{X}$ and $\mathbf{X} \to \kappa(\chi^{\mathrm{op}})$ pass through $J_X|(\kappa(\chi))^{\flat}$, the base for which $\kappa(\chi|_{\{*\}})$ is the principal ultrafilter. Further,

§A11 the sequence of links l centered about each point {*} are totally disconnected following the removal of some point $\partial[(r\{*\})]$ which adjoins l to a neighbor $l\pm k$.

§A11 The space

$$\widehat{\acute{e}t} = (\mathbb{C}\setminus\pi_{\mathbf{n}}(J_X|(\kappa(-)))\cup\mathrm{Lan}_{(-)}(\kappa+z(-^{\mathrm{op}})$$

is then picked out as the étale site, where – is taken to be an element of $\mathscr{U}_{\varepsilon}(J_X \times_{\mathrm{Spec}\ X} \mathrm{Spec}\ д)$, or the link containing the special fiber of $|\mathfrak{F}|$.

§A12 We may then proceed to establish that

$$\mathrm{sp\acute{e}t}\{\mathfrak{F}_i\}_{i\in I}$$

is the étale spectrum of $\mathscr{W}$, such that there is a faithful morphism

$$\mathfrak{F}_{\mathrm{fpqc}}\colon \mathcal{H}_i \to \mathscr{W}$$

and an evaluation $\mathscr{W}_n \times \mathscr{W}_n$: Spec д $\to \widehat{\acute{e}t} \in \mathbb{CP}_{\kappa}^{<\infty}$ which linearly factorizes the set diagram whose maps are $\lambda \to д_0$ and $\widehat{\acute{e}t} \to \mathbb{CP}_{\kappa}^{<\infty}$.

§Pn.3 Write $\boldsymbol{\Delta}[\widetilde{\mathfrak{F}}_c]$ for the centralizer of $\mathrm{Pro\acute{e}t}(\mathbf{U}_{\hat{\alpha}})_{\hat{\alpha}\in\mathbb{CP}_{\kappa}^{<\infty}}$. Write $\mathscr{W}_n \times \mathscr{W}_n$: Spec(–) $\to \boldsymbol{\Delta}[\widetilde{\mathfrak{F}}_c]$. By **§A4**, this is the canonical Katětov functor acting on the discrete and totally disconnected generator $\mathrm{ind}(\widehat{\alpha})$.

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Skizo de Kunbordismo

§Preamble

Flanken Se mi devas elekti inter religio, kiu kondamnas ĉiujn aliajn, kaj tiun, kiu ne, sciante nur kompaton, mi ĉiam elektos la lastan.

Coda Time is the animation of the aura, colloquially known as the meaning of life.

§B1 One may, in a fit of inspiration, attempt to construct a tower of morphisms in the following fashion:

$$\mathbf{\Delta_0}[\widetilde{\mathfrak{F}}_c] \to \dots \to \mathbf{\Delta_n}[\widetilde{\mathfrak{F}}_c]$$

§B2 Write $\Delta_{\eta_i} \coloneqq \mathbf{coh}(\widetilde{\mathfrak{F}}_{c(i)})$ for the i-truncated homotopy coherent nerve whose right-exacting Katětov functor induces a desired cohomology on η.

§Rm.1 One finds that, essentially, the functor $\eta_i \to \eta_{i'}$ preserves all tame inverse limits. For instance, one has that $\lim_{\leftarrow} n\ \mathbf{\Delta_n}[\widetilde{\mathfrak{F}}_c]$ sends i’ to i, much in the same manner as max[0,1] → min[0,1] sends 1 to 0. Thus, after some consideration, it is possible to construct an E-chain $[\widetilde{\alpha}]_E, [\widetilde{\beta}]_E$ consisting of distinct α, β such that there is a natural transformation $(\alpha_i \to \beta_j) \Rightarrow (\Delta_{\eta_i} \to \Delta_{\eta_j})$. It holds that if η is weakly chain connected, then $\mathbf{coh}(\widetilde{\mathfrak{F}}_{c(i)})$ consists in perfect replicas of covers of $\mathbf{Nec}(\mathbf{\Delta})^{\#}$.

§Rm.2 For an operation manual on necklaces, see [Rig]. Much of the theory of Rm.1 is due to Plaut, and can be found in [WC] and [UU]. Specifically, see the “chain lifting lemma” [WC, lemma 10]. For information about perfect replicas, see [Bu].

§Df.1 Let $\Delta_{\eta_i} \to \Delta_{\eta_{i+a}} \to \Delta_{\eta_{i+b}}$ be represented by the monad $\mathbf{M}{:}[\eta,a,b]$. We will call the action $\{g \in G \mid G \coloneqq \mathrm{Hom}(a,b)\}$ **prodiscrete**, and, if there is an isomorphism $j\in(\eta_{i+a})\cong k\in(\eta_{i+b})$, then we say that there is a **covering map** (of uniform spaces) π**:M** → **M**/g

§Rm.3 In order to talk about covering maps in the sense of [WC], the notion of an **entourage** of a **uniform space** must necessarily be introduced. To spare the reader the burden of resorting to the [WC], we provide the following definitions:

§Df.2 A **uniform space** is a topological space X, together with a collection of symmetric subsets X×X containing a subset super to the diagonal, called **entourages**.

§Df.3 An entourage is a distinguished subset of a uniform space satisfying the following triangle inequality:

"For every entourage E there is an entourage F such that $F^2\subset E$."

§Rm.4 These definitions are nearly verbatim from [WC, page 3]. Further, it is stated, "F^2 is the set of all (x,y) such that for some w, (x,w)(w,y) are in F." Such a w has a special place within the study of uniform spaces, and shows reasonable agreement with our notion of a point which is simultaneously left- and right-exacting, so we may safely write $\widehat{w}$ for such a point where it is used.

§Th.1 The monic arrow $\widehat{w} \hookrightarrow \mathbf{F}^2$ agrees with $X_L\beta\prod_x^y X_R$ up to inductive colimits.

§Pf.1 Let $Lan_F(w)$ be exact in F^2. It is clear that the image lies in E.

Write X_L for x and X_R for y. Then, one has $X_L \rightarrow Lan_F(w) \leftarrow X_R$ is representatively generated by some $w' \in X_{<*,*>}$. By the chain lifting lemma, there is a basis $\mathcal{B}$ for which the lifting $[\widetilde{w}]_\varepsilon \rightarrow E$ provides a direct translation from <x|w|y> into $\beta_{xy}\beta^{yx}$. We finish this proof by noting that this may be written as **pre**(w), which allows one to observe that there is a prodiscrete and isomorphic action **pre**$(w)^2$=F^2, and therefore, there is a good covering map π: $X_L\beta\prod_x^y X_R \to (X_L\beta\prod_x^y X_R)/\beta$, which is w. **Quod erat demonstrandum**

§Rm.5 Our earlier construction $\mathbf{\Delta_0}[\widetilde{\mathfrak{F}}_c] \to \dots \to \mathbf{\Delta_n}[\widetilde{\mathfrak{F}}_c]$ has been translated such that there is an inclusion from every n into an entourage F^2, and $\widetilde{\mathfrak{F}}_c$ is, under this view, an ordinary E-space.

§B3 Consider the cobordism: $\mathcal{C}_2 \coloneqq (\mathcal{D}_1,\mathcal{D}_2)^{\mathbf{disc}} \leftrightarrow \mathcal{D}_0^{\mathbf{full}}$, which bifurcates at $\beta_{\mathcal{D}_1},\beta_{\mathcal{D}_2}$, and consider the total space of $\mathcal{D}_0^{\mathbf{full}}$, assuming uniformity. Let pre$(\widehat{w}) \to \widehat{w}$ be a mapping from an entourage E in the $\mathcal{D}_0^{\mathbf{full}}$ to an isolated singularity at which the rays tangent to $\mathcal{D}_1,\mathcal{D}_2$ converge. One has that there is a perfect replica of the marked point $\widehat{w}$ in each of $\mathcal{D}_1,\mathcal{D}_2$, and $\beta_{\mathcal{D}_1},\beta_{\mathcal{D}_2}$ are the covering sieves which replicate the marked point. Because of this, we will refer to a point of the form $\widehat{w}|_{\square^\wedge}$ from now on simply as a "marking."

§Rm.6 Marked surfaces have been an intense topic of study for at least the past few decades. Classically, a *marked Riemann surface* (X,f) is a Riemann surface X together with a homeomorphism f:S → X. Two marked surfaces (X,f)~(Y,g) are equivalent if gf^{-1}:X→Y is isotopic to an isomorphism. This definition is more or less verbatim, see [IntT].

§B4 Notice that the marking provides us with a succinct inverse limit in the following covering diagram:

$$
\begin{tikzcd}
& & \mathcal{D}_0^{full} \arrow[lld, dashed, "proj"'] \arrow[d, "\pi"] \arrow[rrd, dashed, "proj"] & & \\
\mathcal{T}_{m_1} \arrow[rr, mapsto, "sing"] & & \hat{w} \arrow[ld, hook, "\beta"] \arrow[rd, hook', "\beta"'] & & \mathcal{T}_{m_2} \arrow[ll, mapsto, "sing"'] \\
& \mathcal{D}_1 \arrow[lu, bend left, "ind"] & & \mathcal{D}_2 \arrow[ru, bend right, "ind"'] &
\end{tikzcd}
$$

§B5 This is the classic "pants diagram." Here,

$$\widehat{w} = \mathcal{T}_{m_1} \cap \mathcal{T}_{m_2} = \text{spec(rep(}\mathcal{D}_0^{full}\text{))} = \text{int(cl(comp(}\overline{\mathcal{D}}\text{)))},$$

where comp($\overline{*}$) refers to a complex whose fibers are of type principally-*.

§B6 The lower triangles are co-degenerate; the upper triangle represents the simplicial complex whose base is the upper disk. Specifically, $\widehat{w}$ is the one-point compactification[6] for the pushouts of all of $\mathcal{D}_n$.

§Df.4 Call such a diagram **maximally co-degenerate** if hom($\mathcal{T}_{m_n}, \widehat{w}$) is replaced with the empty arrow.

§B7 Let l=$\mathcal{S}^1$ be a based loop consisting in the endpoints [i,e] (disjoint), and pick an ε less than |e-i|. Partition l into equidistant intervals of distance ε. We have that $\frac{|e-i|}{k\varepsilon}$ gives us the kth ball from either i or e. For $\beta \circ \pi$: k$\in\mathcal{D}_0^{full} \rightarrow \hat{*} \rightarrow$ k$\in\mathcal{D}_n$, call such a ball the **kth representative generator** of $\widetilde{\mathcal{D}}$, the total space of the diffeadic $\mathcal{D}$-complex. Note that the mapping is

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[6] It would be comfortable enough to assume this to be the algebraic Alexandrov compactification. We will omit the definition, but note that it is provided in [QN, proposition 2.3], and the reader may also find it beneficial to consult [BCR, proposition 3.5.3].

prodiscrete, and isotopic, and therefore $\lim_{\leftarrow} \widetilde{\boldsymbol{\mathcal{D}}}$ forms a perfect covering sieve for all $k_i \to k_{i'}$.

§B8 $\boldsymbol{\mathcal{T}}_{m_n}$ is *right-exacting* if the singularity is given by the chain of morphisms sing:$\mathcal{D}_{j-1} \to \boldsymbol{\mathcal{T}}_{m_{j-1}} \to \widehat{*}$. Otherwise, it is *left-exacting*, and the singularity is given by the chain sing:$\widehat{*} \leftarrow \boldsymbol{\mathcal{T}}_{m_{i+i}} \leftarrow \mathcal{D}_{i+1}$.

§Pn.1 Let there be a chain of morphisms of the form $\boldsymbol{\mathcal{T}}_{m_{i-q}} \to \boldsymbol{\mathcal{T}}_{m_{i+q-1}} \to \ldots \to \boldsymbol{\mathcal{T}}_{m_{i+1}}$. Then the subspace spanned by $(\widehat{*},\mathcal{D}_{i+q})$ is uniformly simply connected, and hence locally simply connected.

§Rm.7 The set of all representative generators [0,...,kth] form the quotient of a marked Riemann surface. We may like to think of this diagram also as an elliptic curve punctured at some point $\widehat{w}$ whose tangent at $\boldsymbol{\mathcal{D}}_0^{full}$ intersects either of $\mathcal{D}_1,\mathcal{D}_2$.

§Q.1 What is the genus of a maximally co-degenerate complex of this form? How may we compute the genus of a complex with p representative generators extended to the qth limb? Assume that all of the epic and monic functors represent weakly chainable uniform spaces whose entourages are respectively $\boldsymbol{\mathcal{D}}_{(q/2)-1}^{full}$ and $\mathcal{D}_q,\mathcal{D}_{q/2}$.

§Pn.2 Maximally co-degenerate complexes have a genus $\geq$q-1.

§Rm.8 By the uniformization theorem, this would mean that a maximally co-degenerate complex of the simplest form has genus 1, and is therefore homeomorphic to $\mathbb{C}$. All other complexes would then be homeomorphic to $\mathbb{H}^2$. If this were the case, we could pick $\mathcal{D}_1$ to represent the reals, $\mathbb{R}$, and $\mathcal{D}_2$ to be those complex-valued numbers which are algebraic over the reals. Then, $\boldsymbol{\mathcal{D}}_{(q/2)-1}^{full}$ is compact, and reflective of the complex numbers, taking the eigenvectors acting on $\widehat{w}$, respectively $\vec{w}\langle\mathcal{D}_L|$, $\vec{w}|\mathcal{D}_R\rangle$. Further, we have that $\widetilde{\mathcal{D}}^{\text{disc}}$, the totally disconnected components of $\widetilde{\mathcal{D}}$, are indistinguishable from the complex as a whole.

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as. I am at once taken aback by and impressed not only with the selfishness of men, but with their greed in hoarding their altruistic tendencies; specifically, they guard them, and make no one privy to their majesty. In the firmament, with bated breath do we wait, as, in trifling about, we stumble towards a most parsimonious state of affairs.

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§B9 In 2019, B. Elzar [QN] introduced the category **QN** of **quasi-nash** structures in order to unify Nash manifolds with algebraic varieties. We will mangle these results, and amalgamate them with those of [Sch.] (Gourevitch-Aizenbud)[7] to create a Frankensteinian hodgepodge of ideas to suit the cobordic complexes which we have herein sketched.

To start, recollect that a **Schwartz function** on $\mathbb{R}^n$ has the following seductive properties; $\mathcal{S}(\mathbb{R}^n)$, the **Schwartz space**, is:

- Fréchet
- Invariant under Fourier transforms
- Integrable over every one of its function

This is standard recollecta, á la [QN].

§B10 We may like our diagrammatically espoused cobordism $\mathcal{C}_2$ to be a **Schwartz space**; obviously it is then **Fréchet**; less obviously, it is a prototypical member of **qB**, as depicted in [Quo]. Then, we become immediately interested in $\mathbb{R}$-spaces. Let us borrow the following definitions:

§Df.5 An $\mathbb{R}$**-space** is a pair $(\mathcal{M},\mathcal{O}_{\mathcal{M}})$, where $\mathcal{M}$ is a restricted topological space and $\mathcal{O}_{\mathcal{M}}$ a sheaf of $\mathbb{R}$-algebras over $\mathcal{M}$ which is a subsheaf of $\mathbf{C}_{\mathcal{M}}$, the sheaf of all continuous real-valued functions on $\mathcal{M}$.

The definition of a Nash manifold comes in three steps

[7] It is fortunate to us that Elzar was himself an eager student of Gourevitch and Aizenbud.

§Df.6 A **Nash submanifold** $\mathcal{M}$ of $\mathbb{R}^n$ is a *semi-algebraic subset* of $\mathbb{R}^n$ which is a smooth manifold. A nash function on $\mathcal{M}$ is a smooth semi-algebraic function.

§Df.6 An **affine Nash manifold** is an $\mathbb{R}$-space isomorphic to an $\mathbb{R}$-space associated to a closed Nash submanifold of $\mathbb{R}^n$.

§Df.8 A **Nash manifold** is an $\mathbb{R}$-space $(\mathcal{M},\mathcal{N}_{\mathcal{M}})$ with a sheaf of Nash functions, which has a finite open cover $(\boldsymbol{\mathcal{M}}_i)_{i=1}^n$ such that each $\mathbb{R}$-space $(\mathcal{M}_i,\mathcal{N}_{\mathcal{M}}|\mathcal{M}_i)$ is an affine Nash manifold.

Let us supply, in addition, the following definition:

§Df.9 A **C-Nash manifold** is a Nash manifold $\mathfrak{M}$, together with a refinement $(\mathcal{M},\mathcal{N}_{\mathcal{M}}) \rightarrow \mathbb{C}(\mathcal{M},\mathcal{N}_{\mathcal{M}})$ which extends a stalk of $\mathcal{M}_i$ to a coordinate patch $\mathbb{C}[\mu,\nu]$ in a Teichmüller space $\mathbb{T}_M$.

§B11 Write $\boldsymbol{S}(\mathbb{T}_M^+)$ for the **Schwartz space** corresponding to a □-small subsection of the Teichmüller space $\mathbb{T}_M$ which *almost covers* every open neighborhood of the image of $\mathcal{N}_{\mathcal{M}}$.

§Pn.3 The paths $p_i \rightarrow p$ into $\boldsymbol{S}(\mathbb{T}_M^+)$ form a cover of the Nash bundle in $\mathcal{C}_2$.

§Sk.1 We can decompose Bun$(\mathcal{C}_2)$ into a continuous sheaf of unit slices, each of which are weakly chain connected from $\mathbb{R}$ into $\mathbb{C}\cup\{*\}$.

§B12 We have now a terse functor ins: $\mathcal{N}_{\mathcal{M}} \rightarrow \mathbb{T}_M$. Write **@**$(\mathcal{D}_n)$ for the atlas formed by

$$\boldsymbol{\mathcal{D}}^{\varepsilon\,-1}_{(q|q/2)} \circ (\boldsymbol{\mathcal{D}}^{\varepsilon}_{(q|q/2)} \rightarrow \boldsymbol{\mathcal{D}}^{full}_0).$$

§Pn.3 The functor @$(\mathcal{D}_n)$ is faithful.

§Pf.2 Write **A** for $\boldsymbol{\mathcal{D}}^{\varepsilon}_{(q|q/2)}$. Since $A^{-1} \circ A = \boldsymbol{\mathcal{D}}^{\varepsilon}_{(q|q/2)}{}^{-1}$, the morphism is epic. Further, f(A)=(A → $\boldsymbol{\mathcal{D}}^{full}_{0}$) is also epic, since $\boldsymbol{\mathcal{D}}^{full}_{0}$ consists in the disjoint unions of all of the germs of A. □

§B13 Let @($\mathcal{D}_n$) → $\mathcal{A}^{\infty}$ be crafted by allowing for every $\mathscr{K}$⊊@($\mathscr{D}_n$) to be a representative generator of some "higher" topological space, or more generally, stack, having codimension q-1, such that the codimension of $\mathcal{A}^{\infty}$ is precisely the genus of $\mathbf{A}^{*}$. For every totally disconnected group **P** in $\mathcal{A}^{\infty}$, there is an intersecting transverse plane which forms the leaf of the complete foliation of the deck of chiral transformations of @($\mathcal{D}_n$), whereby "chiral transformation," we mean a function f(c)=kx+1 for k a rational number whose denominator is not relatively coprime with x.

§B14 F(c) is a cosieve of c, when c is selected to be a rigid element of an affine curve, which is homotopic to the torus. See theorem 0.7 in "commentary on foliations" for a palatable diffeomorphism which may be gerrymandered to suit the context at hand if need be, essentially between c and some d in $\mathscr{K}'$ of opposing chirality.

§Wr.1 One must be careful when importing the aforementioned theorem to the present discussion. For instance, for a bound, smooth surface of genus p, the fundamental group of the hypersurface centered about the codimensions of p may not, in general, be identical with its image. Even sidestepping the desire for rigor and computation, we would need a sufficiently nurtured notion of fragmentation (in the vein of Sam Nariman), or a field of factors approximating something close to such a notion.

§B15 Following [Fra], write:

$$\mathrm{Fr}(M)\times_{GLn(\mathbb{R})}F^{f}(\mathbb{C}^{\infty}) \to M$$

to be a natural frame bundle over M obtained as the product of the frames of M taken together with their formal solutions in an infinite-dimensional complex space.

§Th.2 For a "suitable choice" of infinity, i.e., a unit of cofinality, $(\mathrm{im}(M)) \cup \{\aleph^{\omega^{\omega}}\}$ becomes a canonical ∞-topos.

§Sk.2 Say ω^{ω} is the perfect and complete Cantor set obeying the Suslin property. From [TaS, definition 1.1], we have that im(M) is obtained by taking complete lattices satisfying the following property:

$$A \wedge \vee S = \vee\{a \wedge b \mid b \in S\} = \mathbf{K}$$

This may be transcribed to $\mathbf{K}^{\#\circ}$ using Scholze's notation [PS]. Let us choose our topology so that it forms a chain

$$\mathbb{N} \subset \mathbb{R} \subseteq \mathrm{im}(M) \subset \mathbb{C}$$

We have that the sections of $M_i|_{i\in I} \to \mathrm{im}(M)$ transverse to the fragments of k centered about a point d and forming an ε-chain whose cover is an entourage of M has codimension p-1 at most. Therefore, M is small, and therefore tractable, and the limit of the sequence $M \to M \to \ldots \to M$ lying in $(\mathrm{im}(M))^{\bullet}$ is a large category, $\mathbf{MC}_{at}$, which is an ∞-topos. Q.E.D.

§Rm.9 Assuming M to be normal, then by theorem 6.1 of [Tor], the sequence $\mathbf{T}|_M : M \to M \to \ldots \to M$ is a toric stack, and by lemma 3.5 [ibid], we may write:

$$\widetilde{D}_M(D_1 \times_M D_2) \cong \widetilde{D} \times_{\Delta_{\widetilde{D}}, \widetilde{D}_i \times \widetilde{D}_j} (\widetilde{D} \times_M D_1) \times (\widetilde{D} \times_M D_2)$$

which condenses to

$$E(\Delta_{\mathrm{im}(M)})^{\#}$$

where E is a "good" moduli space, and $\Delta_{\mathrm{im}(M)}$ cohomologically affine.

§Rm.10 This notation assumes that E has the following properties:

- Every M in E is an entourage of E such that e^2 lies in E, which lies in M; formally: $e^2 \subset E \subset M$

- The diagonal $e \times e$ is one to one with the transversal of $E^{1/2}$
- The completion of M is Cartesian

These properties are an outgrowth of the allowance that M be normal.

§Pn.4 M^2 is Lebesgue integrable.

§Sk.3

$\int\int M \star \delta \in im(M)$ has strong support, is vectorizable, and subsets of E are Lebesgue measurable.

§Wr.2 M^2 is not necessarily Riemann integrable. If the immersion from some M_i into $M^2|_I$ takes place in a non-Noetherian stack [see Stk1], then blow-ups around the (possibly imperfect) co-sieves centered about some kth neighbor i′ (assumed to be a non-representative generator) fail to be integrable, and further, resists the application of the Dirac delta function. Such a situation implies the existence of some point $\hat{i}$ which is the open image of a functor which is non-quasi-compact.

§Pn.5 Non-Riemann measurable is synonymous with stating that $\hat{i}$ is not the representative generator of any subgroups other than itself and M^∞.

§Pf.3 Let $\partial\hat{i}$ be unbounded, such that there are no zeros of the function $f(\hat{i})-p\partial\hat{i}$ for any p. Such a function is clearly not Riemann measurable, given a theory of calculus which permits only those functions which are compatible with the Dirac delta function.

That this is synonymous with the statement of **§Pn.5** is not immediately clear. However, we may fix a measure of cardinality $q(\delta):n \rightarrow \lambda_p$. Then, we let n be the recursive ordinality (operadicity) of the function f(q). In the case where $q=\hat{i}$, we have that that the toric stack corresponding to q is nil; therefore, the "ins-variety," which is quantified by the number of ins-mappings (see **§B12**) for which there a retract of q exists as a kernel, is empty.

Thus, if there is a correspondence of models **Riem~insvar** between the theory of Riemann measures and the cardinality condition on ins-varieties, $\lambda_{<1}$, the number of subgroups for which $\hat{i}$ representatively generates.

§Pn.6 There is a correspondence of models **Riem~insvar**.

Scene.

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※2
Intermezzo - Towards Supersites

§C1 I have found a new word to describe my recently established notion of a point that is simultaneously, as I say “left-” and “right-exacting.” Following Massey [Nex, pg.2 & pg.8], if an object $\widehat{p_0}$ is central to a diagram in which there is both a horizontal and a vertical component, and if all of the functors passing to such an object are monomorphic, such that it has both exactly one left-exacting and right-exacting predecessor per arrow, then such an object is to be called a “*nexus*.”

§C2 Let μ<*,*> be an induced metric on a topological space, not necessarily Hausdorff, and let $\mu|_N$ be the normalization of this metric to some unit curve. We want to select a suitable object of **Top** such that we may have confidence in our identification of a bonafide nexus.

§C3 Suppose that the metric space (**X**,μ) is locally representative of $\mathbb{R}^n$, and there is a change of basis such that one point of the elliptic curve **g** is removed from $(\mathbf{X_n},\mu)$. Assume that the π-weight of the graph whose nodes are zeros of an equation in the Cartesian space of $\mathbb{R}^n$ remains constant. Further, let us posit that it is one of these zeros which has been removed, and the limit becomes undefined as we approach this point, say in $\mathbb{R}^2$.

§Th.1 There is a map $\mathbb{R}^n \to \mathbb{R}^{n+m}$ such that the deleted zero of $\mathbf{X_n}$ is space-filling in a geodesic in $\mathbb{R}^m$ which simply connects the graph on $\mathbb{R}^n$ with its induced metric.

§Pf.1 Because the π-weight of $(\mathbf{X_i},\mu)$ is forced to remain constant, we can select an i greater than n such that it is equal to n+m.

Thus, given a representative slice of a Banach space, $\mathbf{B}_n$, we define the morphism $\mathbf{B}_n \to \mathbf{B}_m \to \mathbf{B}_n$ such that it is a surjection, and therefore there is a nexus $\widehat{m}$ whose eigenalgebra is a subalgebra of the eigenalgebra of n. By the restriction $\mathbb{R}^2|_1$, for instance, we obtain a single unit of positive weight lying in some 1-dimensional space which which is distinct from the initial 2-space. **Q.e.d.**

§Rm.1 In specific, designate the special point as g/τ, and say that it is a torsor of the algebra acting on the map $\mathbb{R}^n|_m$. Further, we may like the geodesic to be a *Peano curve*.

§C4 Because nexuses preserve both left-exacting monomorphisms and right-exacting epimorphisms, then there is an interior of $\mathbb{R}^n|_m$, for m<n, for which the target object of the functor $\mathbb{R}^n \to \mathbb{R}^{n+m}$ is stratified with respect to. In other words, there is a lifting

$$\{*\} \twoheadrightarrow \mathbf{g}$$

from the point of regular π-weight to a homogenous geodesic such that

$$(\mathbf{X}_n, \mu) \cap \mathbf{g} \hookrightarrow (\mathbf{X}_n, \mu)$$

but

$$(\mathbf{X}_n, \mu) \twoheadleftarrow (\mathbf{X}_n, \mu) \cup \mathbf{g}$$

§C5 This gives us, more or less, a blueprint for lifting out of 0-dimensional points to points whose existence is synonymous with some m-dimensional topological space, say it is Banach. This works from moving out of **Top** and into **PDiff**, the category of partially differentiable manifolds. Therefore, nexuses, when considered as components of geometric varieties, have point-like compactifications, and therefore π-weighted point-like representations, but in general the nexus object (even of a geometric space) need not be a point, only that its representative generator be "point-like." In general, the principal classifying space of a nexus will be m-dimensional.

§C6 Such an m-dimensional nexus admitting a point-like retract will be called a "**supersite**," and there are essentially two ways of going about describing a supersite; the first is to use the machinery we have just introduced, by which the intuitive limit of curves with undefined formal limits are thought to be embedded in some higher-dimensional ambient space by virtue of a simply connective geodesic. The second technique, and the one which may be preferable, is to think of these supersites as "points with *negative-dimensional spaces*" hidden within them.

§C7 These negative dimensional spaces function in every way identically to those of positive dimensions, only that they are embedded within the zero-dimensional point itself rather than in some higher-dimensional Hilbert space. Thus, for a Hilbert space of $\aleph$ dimensions, we have that there are $\leq\aleph$ negative dimensions. Therefore, we have

$\aleph - \leq \aleph$ dimensions,
which equals
≥ 0 total dimensions.

§C8 Negative dimensional spaces have been previously considered, for instance in [PNDP], where the concept of a "partially negative dimensional product manifold" was introduced. Such manifolds ease certain calculations, or make them more intuitive. For instance, when one wants to perform a desuspension, it is easy to think of the fiber as having a negative dimension relative to the base. Further applications to supersymmetric quantum field theory exist as well, see [Neg].

§C9 An "infinite dimensional Hilbert space" (IDHS) is, under some consideration, an ambiguous construct. Say that our ∞-ideal is $\aleph$, and for the purposes of argument, say that $\aleph/2\neq\aleph$. Then, a space with $\aleph$ dimensions may either be thought of a space where there are $\aleph/2$ positive dimensions and $\aleph/2$ negative dimensions, each quantified by absolute value, or a space in which there are $\leq \aleph$ negative dimensions. In fact, the first case is merely a restriction of the latter. Under such a view, there are two possible varieties of IDHS's:

a. Balanced, or pure supersites
b. Mixed supersites

§Df.1 Call a space a "pure supersite" if its total number of dimensions ($D_{positive}$ - $D_{negative}$) is equal to 0, and mixed otherwise. Call a Hilbert space (respectively, Banach space, or principally

*-space) a Balanced Hilbert space (resp. balanced Banach space, or balanced *-space) if it is an isotopy of a pure supersite, and a "**warped Hilbert space**" (resp. a warped Banach space, or warped *-space) otherwise.

§C10 In [Ima], the authors envisioned the act of transitioning from a compact (Hausdorff) topological space ξ_0 to a disjoint partner point ξ_1 as accomplishable by the act of "spinning" in a higher number of dimensions. Also considered was the negative dimensional perspective, in that desuspending points would yield negative dimensional spheres, $\mathcal{S}^{-m}$, which would need to be rotated in the pointlike space in order to obtain the zeroth dimension. We may extend this notion, more generally to *toric stacks*.

§C11 Let $\ell[\xi_n]$ be a toric stack, and permit that there is a barycentric point of $\tilde{g}\in\ell[\xi_n]$. Then, we have a connection to a base manifold **M** in which the suspension $\Sigma:n\rightarrow n+m$ occurs. In considering such a convolution, we may like to pick a θ-adherent point to act as our torsor, and then define the site $\Sigma(\ell)$ to be one in which there are a set of minimally wandering locales, e-close to such a point.

We can then use Alexander's trick to establish the manifold $\mathcal{S}^{m+n}$ as an isotopy of rep($\ell[\xi_{n+m}]$), as they agree on the boundary $\mathcal{S}^m$ up to the torsor θ.

§Pn.1 If $\mathcal{S}^m$ is weakly chained, then so is $\Sigma(\ell)$.

§Rm.2 An astonishingly large class of spaces are weakly chainable, including Hawaiian earrings and solenoids [see **※1**, ref:WC]. If the braid group of such a space is one-to-one on its image, then the total space is weakly chained.

§Pn.2 Such a space that satisfies **§Pn.1** has as its nexus $\hat{\theta}_m$.

§Sk.1 This follows from the Poincaré duality.

$$\Omega(n) \rightarrow \Omega_0(m+n) \leftarrow \Omega(m)$$

First, allow that there is an "elementary neighborhood," and that it be e-adherent, or in other words, θ-adherent up to a choice of e for the e-chain.

Then, construct the isomorphism

$$M^{*}, \{annM_{e}\}(\ell) = \bigoplus_{\theta} M^{\Sigma}_{n,g_{\ell}, \{ann(M_{e} \cap g_{m+n}\}}(\ell)$$

between the vanishing cocycle of M^{*} and the cohomology theory of $\Sigma(\ell)$, as per [Poi].

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The Peanut Gallery

Nothing to see here, move along

Citaĵo “An equilibrium is reached as soon as no party can increase its profit by unilaterally deciding differently.” -John F. Nash

Citaĵo “The resistant strain has the smallest growth rate and is in this sense the weakest. Hence, the resistant strain always survives!” -Erwin Frey

Citaĵo “I think it’s absurd, these people think [b-gauges are] somehow a solution. To me, I just see a big ugly mess desiring to be communicated.” -Parker Emmerson

§D1 Before we may even begin to furnish the home, it must be ensured that we have one; by default, it is Earth, and so it is had. Yet, if it is a “home” we desire, we may begin to associate such a place with furnishings of some kind; even the lowly wigwam needs a corner to be designated for sleeping.

§D1 We may find good in things; greatness in men; perfection in God.

§D2 Guessing
"to arrive at
a correct conclusion
by conjecture, chance or intuition"

§D3 “It is usual to think of a G-space as built up from the G-fixed subspace X^G by adding points with successively smaller and smaller isotropy groups. This gives a stratification in which the pure strata consist of points with isotropy groups in a single conjugacy class.” -J.P.C. Greenlees, pg. 5

Citaĵo “For Thurston and for all mathematicians, mathematics is a sensual, carnal experience situated upstream from language.

Logical formalism is at the heart of the apparatus that makes this experience possible. Mathematics books are unreadable but we need them. They are a tool that allows us to share in writing the true mathematics, the only one that really counts: the secret mathematics, the one that is in our head.” -David Bessis, Mathematica

Citaĵo “My work always tried to unite the truth with the beautiful, but when I had to choose one or the other, I usually chose the beautiful.” -Hermann Weyl

※3
Sakadoj de la granda lemuria

§Sak1 Let there be a sequence ℓ with an induced preorder ϕ, and write the composition as $\phi \circ \ell^{-1}$ as $\phi{:}\ell$. Denote the ordinality of $\phi{:}\ell$ as γ. Further, assume that there is a valuation on $\phi{:}\ell$,

$$\tau{:=}\phi{:}\ell \rightarrow L_{|\{F\}|}$$

where for every $f \in F$, there is a bijection $\gamma(f)\leftrightarrow l\in\phi{:}\ell$. Call $\phi{:}\ell$ a "sentence", and suppose that F is a sheaf composed by "gluing" together rings of anisotropic (read: *polyserial*) gradations of typed existential quantifiers. I.e,.

$$\{F_e\}_{e\in E} \leftrightarrow \exists\tau_e\in T,$$

such that every member of the scheme E receives a corresponding polymodal index in T.

§Ex.1 Say there is a sentence $\sqcup^2{:}\{a,b,...,h\}$, where $\phi{=}\sqcup^2$ is the disjoint union mod 2, or in other words a bi-regular enumeration. Then, let us suppose that such an operator induces the preorder

$$\sqcup^2 \leftrightarrow \{a=b\} \lesseqqgtr \{c=d\} \lesseqqgtr \{e=f\} \lesseqqgtr \{g=h\},$$

where the symbol $\lesseqqgtr$ is generic, quasi-periodic, and liberal, meaning that the equivalence between members of sets $\{A\} \lesseqqgtr \{C\}$ is superficial, and is therefore class-level.

Then, say we have some rule, **r**, which reads as follows:

$$\frac{XYZ \leftrightarrow T_T}{x \lesseqqgtr y \lesseqqgtr z}$$

A possible interpretation of this rule is that the sentence formed by $\sqcup^2{:}l,m\in X;n,o\in Y;p,q\in Z$ is *strongly true* if for $\gamma(p_f)$, $f\in F_p \leftrightarrow \exists\tau_p\in T$. In other words, the sentence is true if the *order of the letters* of the sentence (l,m,etc.) is compatible with the *order of the words* (X,Y,Z), and thus there is a one-to-one correspondence between the truth values of each term and their ordering.

So, let us take the following (English) sentence:

"The big red dog has a nice hat."
X Y Z ɑ

The following sentence:

"The dog has hat."
X Y Z ɑ

while syntactically flawed, is technically correct if the first one is, as it respects the ordering of truth values, and so is equally correct. However, the sentence:

"The hat has red"
X ɑ Z Y

is not isomorphic to the other two, as the correspondence between the sentence $\sqcup^2$:XYZɑ and the truth values $f_{X\alpha ZY}$ are mismatched.

§Rm.1 There are easy examples of real cases, even in traditional linguistics, where this construction fails; for instance, the truth values of words may be flexible, and subject to either some reordering, or tense, strict, and granular. In either case, we may construct a more abstract notion of "order" corresponding to chunks which map to certain referents. We simply need to change our preorder type; change our rules.

§Sak2 Write **Viz.** for the category of visions; objects in this category are to be written $\mathbf{X}_p|_F$; they are called "viewpoints" and morphisms $\mathbf{X}_p|_F \to \mathbf{X}_p|_{F'}$ represent transformations of internal truth values through the projective modulation of valuations; they are called **sakadoj** (*saccades*).

In "Concept Spaces for Mathematicians," I conjectured that there is an equivalence between the maps $\mathbf{X}_p \to \mathbf{X}_{p'}$, and the saccades of Viz. The proof was rather mangled, and toed the lines of "woo-woo" territory; here, I hope that this statement has by now become so obvious as to warrant no proof whatsoever, although I will provide one nonetheless.

§Pf.1 We want to show that for two sentences $\phi:\ell$ and $(\phi:\ell)'$, if either ϕ or ℓ are varied, then $L_{|\{F\}|}$ varies in a similar fashion. First, the variation need not always be marked; for instance, take the trivial variation. Say we have an (incoherent Esperanto) sentence

a a a a a a,

for which the preorder is disjoint union mod 3. Say $(\phi:\ell)'$ is

a a a a a a a a a a a a,

for which the new preorder is disjoint union mod 6. Then, because the first sentence is an Abelian subgroup of the second, the corresponding truth evaluation is identical in F_{12}.

Suppose instead we have

Aba

mod x=2.

Then, we have $\phi:\ell \to \gamma(f_1,f_3)$. Next, let $\phi \to \phi'$ be given by letting $x \to 1$. The corresponding inclusion $\gamma_1(\ell) \to \gamma(f_1,f_3)$ is equivalent to $\gamma_2(\ell) \to \gamma(f_1,f_2,f_3)$ with the axiom of choice and the pigeonhole principle. Thus, the inclusion $\phi:\ell \hookrightarrow F$ is shown to be injective, and therefore a true isomorphism.

※4

Promeni en la parko

♪ Giazotto - Adagio in G Minor "Albinoni's Adagio"[8]

§Pro1 Let Γ be a protagonist (defined shortly hereafter), {a,b} be a double of checkpoints, and ς^{op} the opposite category of representative generators of unitary and finite states of the Giry monad, **G**. Morphisms to and from **G** will be the Kleisli morphisms [KL]. Allow us to set the stage for their interaction; we now introduce **SRel**, the category of stochastic relations as defined in [Pan].

§Df.1 A character Γ of a Sturmian word $\mathfrak{S}$ which *names* a curve complex $\mathfrak{C}$, shall be called "prodigious," if for every finite combination of words in $\mathfrak{C}$, there is an equivalent section of the alphabet in $\mathfrak{S}$.

§Df.2 A prodigious character which names a representative generator of a simplicial complex (i.e., the *spine* of its n-skeleton) shall be called a "protagonist."

§Pro2 Write $(\Gamma(\Delta_a)\leftrightharpoons[\varsigma]\rightleftarrows\Gamma(\Delta_b)) \to \mathrm{Ran}_\Gamma\varsigma^{op}$ for the saccade $\Delta\mu \nearrow \Delta$, where the left-hand side is a furnished ∞-topos of non-trivial measures on a Baire space and the right hand side is the trivialization thereof. We see plainly that if $\Delta\mu$ is a profinite simplicial complex (psc), and b=a, then $\mu=1$. Further, if $\Delta\mu$ is a psc, and $a\neq b$, then the Haar measure of Δ is $|a-b|$, and b is the orthogonal complement of a. It is, however, not true in general that if a,b are orthogonal complements, that they will have a Haar measure $|a-b|$. For example, if the Pontrjagin and Stiefel numbers of Δ_a and Δ_b are identical, as shown in [CTC], such that rep(a) and rep(b) are cobordant, this result will fail in many categories.

§Pn.1 For $\mu=1$, $\tau_{\leq 0}\Delta\mu=\Delta$, where $\tau_k N$ is the k-truncated homology class of N.

[8] Arr. for Piano by F. Pott

§Pf.1 If the generalized measure on Δ is equal to one, then Δ with its μ_i-norm will be equivalent to $\Delta\mu$, and therefore will be 0-truncated. Hence, $\Delta\mu_i\backslash i \overset{\sim}{\curvearrowright} \Delta$.

§Rm.1 This result guarantees that for an immersion of a protagonist into a Bruhat-Tits building, the corresponding inclusion from GL_n into GSp_{2n} will yield no "anomalous" or pathological results. It helps to think of μ as a "miniscule alcove," as per [alc]. More appropriately, the automorphism $\varsigma GL_n \to GSp_{2n}$ for a miniscule coweight μ of unit proportion has trivial orbit.

§Pro3 Let $\varrho \dotdiv \mathbb{m} \div \mathbb{N}$, where $\dotdiv$ is the homothety relationship. Then, let $\pi_1(\mu_i) \curvearrowright p \in Bun_{\mathbb{N}}$. Suppose that there is a character λ, not necessarily protagonistic, for which there is an isogeny complex $\lambda^{\#}$ with a lift into the curve $\mathfrak{C}=\mathbb{Z}/2$. Further, assume that the Haar measure of $\mathfrak{C}$ is equal to a small prime, say $p<6$. Then, there is a *subquotient* of p which representatively generates $Bun_{\mathbb{N}}$, and further, there is a faithful onto mapping $\mathbb{m} \to p/q$.

All of the structure of the Giry monad is preserved; only now, there is a new coat of paint. Combinatorial and probabilistic functors in **G** become arithmetic primitives in $\mathfrak{C}$. To facilitate this crosstalk, we now must contend with a sort of quasi-functor

$$\mathrm{Tr}(\mathbf{Srel}) \rightsquigarrow \mathrm{Fix}(\mathbf{Srel}^{tame}),$$

where the relationships from the initial category are watered down to fixed points with a conformal dual:

$$p^{\vee}$$

which has compact support in the projective image of the map

$$p^{\vee} \in \mathrm{Fix}(\mathbf{Srel}^{tame}) \hookrightarrow \mathbf{Srel}^{\mathbf{tame}}$$

where $\mathbf{Srel}^{\mathbf{tame}}$ is a full subcategory of **Srel**, but not necessarily a Giry monad.

§Th.1 ϱ is the representative generator of $\mathbb{N}$, and $p \sim p^{\vee}$ are the representative generators of $Bun_{\mathbb{N}}$.

§Pf.2 The second half follows from tameness; i.e.,the inverse limits of all of the images of the category to which p belong are extensions of the group to which the action of p belongs.

The first half is not so obvious. Let $\partial\mathbb{N}=\mathbb{m}$ be a Dedekind underslice of the natural numbers and/or their associated topos. To show that $\mathbb{m}$ is representative of $\mathbb{N}$, we must demonstrate that all of the essential properties, i.e. the diagonals of the matrix $GL_{\mathbb{N}}$, are coherent, and preserved. Thus, by letting $n(\mathbb{a}\in\mathbb{A}_n)=\mathbb{A}_n$, we have that **pregrp**$(\mathbb{a})=n(\mathbb{a}^{-1})$, and thus is equal to some a in $\mathbb{a}$. This proves the representativity of a.

By similitude with ϱ, ϱ is also demonstrated to be representative.

§Pro4 It appears to me now that, rather than thinking of the specialization

$$\mathrm{Tr}(\mathbf{Srel}) \rightsquigarrow \mathrm{Fix}(\mathbf{Srel}^{tame})$$

as a “watering down” of sorts, it may be perhaps more proper to think of it as a *desiccation*. I have not much to say on this matter, but it may come in handy later, and perhaps serve a more general purpose to be able to write the functor

$$\mathrm{tr}(A) \rightarrow \mathrm{dess}(A)$$

and thus, in moving from a topological space to its fiber bundle, one may always assign a homotopy map

$$\boldsymbol{\pi}_k(\boldsymbol{\mu}_n) \curvearrowright p \in A,$$

and so lift out of the topological space and into a purely algebraic or arithmetic one while remaining confined to one ∞-topos, modulo a saccade. This is reminiscent of what Barwick and Haine had set about doing in their “Exodromy” paper.

§Pro4 The map

$$(\boldsymbol{\pi}_k(\boldsymbol{\mu}_n) \curvearrowright p \in A) \twoheadrightarrow (\check{p} \in \mathrm{dess}(A))$$

forces the equivalence

$$(p \div \check{p}) \leftrightarrow (p^{E} \check{p})$$

by transferring the homothety of the fiber bundle Bun_A to a concrete realization at a specialized object in the site at which the transition

$$A \Vdash \mathrm{dess}(A)$$

takes place.

§Pn.2 There is some spline for which the forcing for which the site over

$$A \Vdash \mathrm{dess}(A)$$

receives a geometric representation.

§Rm.2 No proof is, as of this writing, available to me with my current tools and know-how, although it is intuitively conceivable that some splicing of HoTT and derived algebraic geometry may yield something akin to one.

One may, in particular, construct a scheme at the site of desiccation and prove that there is a homology between some face-map of a graph of the character acting on A and $\Omega_{k,n}^{dess(A)}$, where k and n are small values, approximately equal to zero.

§Df.3 Call the site over A ⊩ dess(A) **Pot**, and call its spline "potable" if it forms a topological space homeomorphic with the Hawaiian earring or the circle, i.e. that the space admits the function $f:\mathbb{R}^+ \rightarrow \mathbb{C}$ defined by $f(r)=\frac{1}{r^2}e^{2\pi ir} \pm \frac{1}{2}r$.

§Pn.3 If the spline of **Pot** is potable, then there is a function $\log_r(\frac{1}{a})$ yielding the radius of a representative link of the e-chain of the weakly connected psc about a.

§Rm.3 In continuation of the analogy with water, we may think of the potable spline, $\tilde{A}^{pot}$, as being "as safe for consumption" as the previous cup-filling spline; i.e., the cup product of $\tilde{A}^{-2^{pot}}$ with itself; or, more generally, the cup product of $\tilde{A}^{-n^{pot}}$ with itself n-many times. Note, this tidbit is included for the sake of clarity in defining the term itself; it does not, however, yield any non-trivial results beyond its establishment, to my knowledge.

§Df.4 Call a surface ***hydrophobic*** if there exists no potential p_k with a homology[9] to an object in **Pot**, and **aquatic** otherwise.

§Rm.4 Suppose that $\boldsymbol{q}$ is a crystalline structure, and there exists a path $\inf(\boldsymbol{q}) \rightarrow \sup(\boldsymbol{q})$. Say that, in this context, each vertex in $\boldsymbol{q}$ is *pseudo-degenerate*, if for $\dim_p$, there exists an isomorphism between any two vertices, but in $\dim_{p+k}$, for k a natural number,

[9] **§Pro5** describes this homology in further depth

there exists no such isomorphism. Assume that $\mathscr{q}$ is a tree (simply connected, locally path connected, and path connected); we have no guarantee that $\dim_{p+k}(\mathscr{q})$ is tree-like.

By generalization, we do not know the genus of a simply connected surface's higher-dimensional quasi-degenerate expansion. Further, we do not know of any numbers which are transcendental over the algebraic completion of the field F of $\mathscr{q}$. Thus, it is very much a possibility that an aquatic surface *H* (not necessarily discrete) will suffer from hydrophobia if extended to encompass new, irregular vertex sets.

Note that a result of this kind is a specific instantiation of the pathology we set about eliminating in **§Rm.1**, though with a higher degree of universality. To conceive of this in other terms, say that

$$\dim_p(\mathscr{q}\mu) \to \dim_{p+k}(\mathscr{q}^*)$$

is a *clutching* of *truncated globular hypercovers* of a space $\mathscr{q}$ in **Mfold**. Then, in **§Pn.1**, a k-value greater than zero is an *obstruction* to the *lifting* of a *string bundle*. This formulation follows [Str] to a large extent.

§Pro5 For a groupoid $\mathcal{S}$, we may base a point s and form a group $\mathrm{Res}_{\mathcal{S}(p)}$, where the presheaf $\{p_i\}_{i\in I}$ consists in the retracts of p to to a stationary object of $\mathbb{N}$. One defines the usual homology between the objects in this case by

$$(\mathrm{Res}_{\mathcal{S}(p)}) \to p_i \leftarrow (\mathrm{Res}_{\mathcal{S}(p)})',$$

where $i\in((\mathrm{Res}_{\mathcal{S}(p)})\wedge(\mathrm{Res}_{\mathcal{S}(p)}))$. Thus, if $\mathcal{S}$ consists in those objects which may be recovered by the infinite tower of restrictions

$$\mathcal{S}|_{Res_{\mathcal{S}(p)|_{\mathcal{S}|_{\dots}}}}$$

then $\mathcal{S}$ is essentially topologizable, and therefore some functor m in $\mathrm{Fun}(\mathcal{S},\mathrm{Res}_{\mathcal{S}(p)})$ is potable; otherwise, the tower is hydrophobic.

Note that this is an all-or-nothing classification. Thus, we obtain the binary logic

Aq.

whose truth values are (A,H).

Q.1 Is there a "fuzzification" of **Aq.**?

§Rm.5 We will end this session now, and leave this question to be pondered by the reader.

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※5
Balanced supersites are Stone locales

♪ **Rachmaninoff - *Symphony No.2 in Em Op.27 - III.*** ~Adagio

§Df.1 A *frame map* is a monad $[\alpha,\beta,\eta]$ consisting of two frames α,β, and a morphism between them $\eta:\alpha\tilde{\rightarrow}\beta$ which preserves the top and bottom of the underlying lattice lat(α), as well as arbitrary finite meets and joins.[10] Thus,

$$\forall\alpha_i \in \mathrm{lat}(\alpha)$$
$$\eta(\alpha,\beta)$$
$$\text{preserves}$$
$$\{\inf\{\alpha,\alpha_i\},\sup\{\alpha,\alpha_i\}\},$$

and for sub-morphisms

$$\{\alpha_i,\alpha_j\}\rightarrow\{\beta_i,\beta_j\}$$

there is a set of maps

$$\mathrm{Map}(\alpha_{\{i,j\}},\beta_{\{i,j\}})$$

between finite partitions of {lat(α),lat(β)} such that we may write

$$\mathrm{Map}^{sub}(\alpha,\beta) = \mathrm{Map}(\alpha,\beta)^{sub} = \mathrm{Map}(\mathrm{lat}(\alpha^{sub}),\mathrm{lat}(\beta^{sub}))$$

§E1 Wayland ('97) [see Coz] established the category **Frm** in which such maps are morphisms and such lattices are the objects, although there have been much earlier formalizations.[11]

§Df.2 Following [Coz], call α_i a **cover** of α if

$$\inf(\mathrm{lat}(\alpha))=\inf(\alpha_i)$$

and write

$$\mathrm{cov}(\alpha)$$

so that

$$\inf(\alpha^{sub})=\inf(\mathrm{cov}(\alpha))$$

§Df.2 Following [Coz], call α *compact* if every cov(α) has a finite subcover,

[10] In more modern (read: *univalent*) terminology, this is what is known as a "frame homomorphism;" c.f. [Pat]
[11] See, e.g. [RoF]

$$\mathrm{cov}(\mathrm{cov}(\alpha))$$

and thus, the subcover may be written as

$$\alpha^{sub^{sub}}$$

and thus, a frame is continuous if there is an infinite tower

$$\alpha^{sub^{\cdots^{sub}}}$$

with infimum equal to α. In original terminology, say that the *arity* of the morphism η is n if it is between nth order subcovers of α,β; alternatively, say that it is n-differentiable (e.g., first, twice, thrice, etc.).

Thus, say that η is *properly continuous* if there is a tower of morphisms

$$\eta^{\infty}:\alpha^{sub^{\cdots^{sub}}} \to^{\to^{\cdots^{\to}}} \beta^{sub^{\cdots^{sub}}},$$

and thus, it follows that

§Th.1 a morphism between frames is properly continuous if and only if it has infinite arity, up to a suitable choice of strongly inaccessible cardinal, $\aleph_v$.

§Rm.1 An infinitary tower of subcovers of frames along with a single properly continuous morphism forms the ∞-category **PropContFrm**. Its underlying lattice is an ∞-topos, lat(**PropContFrm**), and its actions, i.e. sub-morphisms form an ∞-groupoid.

§Df.3 Following [Coz], call a frame **uniform** if it admits a uniformity (or filter of covers[12]) μ, and write (F,μ) where it occurs. Uniform frames contain

$$\{A,B\} \in \mu$$

such that every $a_i \in A$ is star-refined[13] by some $b_i \in B$.

§E2 The author of [Coz] introduces the following categories[14]:

- **UniFrm**: uniform frames
- **UniσFrm**: uniform σ-frames

---

[12] I.e., a "covering sieve"

[13] The definition of "star-refinement" is rather technical, but is given in [Coz]. It may be grasped intuitively without the need for such minutia.

[14] C.f. the categories used in [RoF]: **CrgFrm** and **RegσFrm** of, respectively, completely regular frames and regular σ-frames.

- **SepUniFrm**: separable[15] uniform frames

We will co-opt the first category to refer to the more general class of *uniformized toposes*, including the uniform spaces discussed in **※1**, and reserve discussions of *uniform frames* only for **UniσFrm**, where we will restrict ourselves solely to σ-frames for some technical convenience; occasionally we will also discuss **SepUniFrm**; generally, the specific category under consideration is not of too much importance here. We will borrow again from [Coz] and write Coz_μ for the functor

$$\textbf{UniFrm} \to \textbf{Uni}\boldsymbol{\sigma}\textbf{Frm}$$

resulting from taking "the uniformity generated by uniform covers consisting of 'cozero' elements" [ibid].

§Df.4 Following [Coz], we define the "**uniform cozero**" part of a uniform frame as follows; take the element

$$a_i \in \mathbf{F}$$

such that

$$a_i = ((0,1])$$

for some uniform

$$H:\mathcal{O}[0,1] \to (F,\mu);$$

identify this morphism as Coz_μ and call its elements ***cozero***.

§E3 Coz_μ has some remarkable properties. Firstly, we can fix a double $(\mathrm{Coz}_\mu,\mathrm{Coz}_\mu) \coloneqq (\mathbb{S}^n,\mathbb{S}^m) \rightrightarrows \mathbb{F}(\mathbb{S}^{n+m})$, such that n,m are dimensions which are not necessarily joint. Then, we can reconstruct the fundamental groupoid of a topological space by assigning uniformity to its associated co-frame, of which the arity has at least n+m. When we rewrite this fact so as to be amenable to the logics of toposes and frames, we get:

$$\mathbb{S}^n \oplus_v \mathbb{S}^m \equiv arity(\mathbb{F}) \wedge \vee \mathbb{F}_0$$

where $\mathbb{F}_0$ is the fixed infimum of all finitely generated subcovers of the lattices whose frames map onto finitely generated subcovers of their co-frame. Thus, $\mathbb{F}_0$ is star refined by $\mathbb{F}_p$ for all $0<p\leq(m+n)$.

Further,

$$\pi_k(a_i) \curvearrowright \mathrm{Bun}(\mathbb{S}^{n+m})$$

gives us $\mathrm{dess}(\mathbb{F}_p)$, and so the *frame bundle* about Coz_μ is observed at the site **Pot**, and therefore the transition

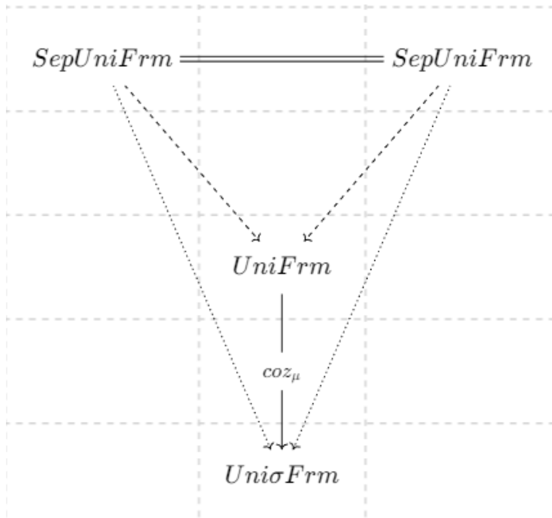
[15] Enumerable; def. as having a basis of countable subcovers

$$\pi_k(a_i) \to \mathbb{F}_p$$

of the chain

$$\mathbf{UniFrm} \to \mathbf{Uni\sigma Frm} \to (\mathbf{UniFrm} \vee \mathbf{Uni\sigma Frm}) \to (\mathbf{UniFrm} \vee \mathbf{Uni\sigma Frm}) \to (\mathbf{UniFrm} \vee \mathbf{Uni\sigma Frm}) \to \ldots \to \mathbf{Uni\sigma Frm}$$

is **potable**, and therefore, has aq(1), where aq(n) is a binary truth value designating whether or not any schema is aquatic. Thus, it is shown that the diagram



is trivially commutative, and thus *cozero preserving* for all

$$\{a_i\}_{i \in \mathrm{SepUniFrm}}$$

forming an Artin stack with cup-product preserving stalks on co-sheaves.

§Df.5 Call a diagram ***cozfine*** [as in Coz.] if it is *cozero-preserving*, and its sites are all toposes of uniform spaces.

§Th.2 Every uniformizable frame with the Shirota uniformity is cozfine.

§Pf. See [Coz, 3.10].

§Rm.2 Note that for a diagram to be *cozfine* is for it to provide an effective descent; i.e., the global structure is pieced together through preimages of its local structure(s). Note that **SepUniFrm** ← **UniFrm** → **UniσFrm** forms a space of adjunctive specializations.

§E4a Following [Pat], we define a "spectral locale;"
§Df.6 a *spectral locale* is one in which (ibid), "the compact opens form a basis under binary meets."
§E4b Recall that a locale is identified with the opposite category **Frm**$^{\mathbf{op}}$ (ibid), and thus a frame may be specified by writing $\mathcal{O}(\mathcal{U})$ for $\mathcal{U}$ a locale, in the standard way. Thus, our reasoning about *cozfine* maps (frame homomorphisms) lifts to the corresponding localic discussion as follows:

for a continuous frame

$$(\mathcal{O}(\mathcal{U}))^{\aleph}$$

there is an adjoint *frame homomorphism* which is *derived from* the map

$$(\mathcal{U})_{i}^{\aleph} \rightarrow (\mathcal{U})_{j}^{\aleph}$$

possessing all of the fashionable properties of the original (c.f. **§Df.2**). Now, assuming the map to be also perfect (which follows from continuity), write

$$\eta(\mathcal{U})$$

for the endomorphism from **Frm**$^{\mathbf{op}}$ into **Frm**. Say that the endomorphism is *cozfine* if, for

$$i_n \in I;\ j_m \in J$$

there is a trivial refinement from i_n into $j_{<m}$, where
§E4c $x=\{i \vee j\}$; x_0 is the **bottom** of $\mathcal{U}^{op}$; x_1 is the **top** of $\mathcal{U}^{op}$, and, moreover,
§E4d the **top** of $\mathcal{U}^{op}$ is the *unit type* and the **bottom** of $\mathcal{U}^{op}$ is the *empty type*, and
§E4e m,n are *fuzzy*.

§E5 In other words, (following [Pat, def.2.6]), a *cozfine homomorphism of frames* is a *nuclear map* from a germ $(\mathcal{O}(\mathcal{U}))^{\dagger}$ to its image $\mathcal{O}(\mathcal{U})$, where by $(\mathcal{O}(\mathcal{U}))^{\dagger}$ we mean the "smallest" object of a frame which has support in its complimentary locale, such that

$$\mathbf{pull}(\mathcal{O}(\mathcal{U}))=\hat{b}=\boldsymbol{\tau}_{\leq 0}\mathcal{U}^{-k},$$

k a natural number.

§Rm.3 This statement is equivalent to saying that $\mathcal{U}^{k}$ is a (globular) parametric right adjoint to $\mathcal{O}(\mathcal{U})^{k-t}$ for k,t positive integers representing arities of the monadic functor

$$\mathfrak{h}_{adj}:\mathfrak{Mon}_{\mathcal{U}} \rightarrow \mathfrak{Mon}_{\mathcal{O}(\mathcal{U})},$$

Which, due to (ntr), means that the category of frames and locales is Cartesian.

§Rm.4 There is another yet alternative and equivalent construction which involves some clever manipulation of wedge products and meets in the opposite category of **Frm**, but we will not dive into this here.

§Df.7 Say that L is "*well inside*" $L^{\hat{}}$ if, for every g,h in L,$L^{\hat{}}$, there is a cozfine homomorphism $H:L \to L^{\hat{}}$ with sup(g,h)=sup(H). Following [Pat], say that $\mathcal{O}(\mathcal{l})$ is *clopen* if it is well-inside itself. Then, say that $\mathcal{O}(\mathcal{l})$ is *zero-dimensional* if it has a small basis $\{\mathfrak{B}_i\}_{i\in I}$ with every $\mathfrak{B}_i$ clopen.

Then (c.f. **§C6**), say that $\mathcal{l}$ is a *supersite* if there is a stack of zero-dimensional frames

$$\mathfrak{S}((\mathcal{O}(\mathcal{l}))_i ※ ((\mathcal{O}(\boldsymbol{\ell}))_j)$$

such that $\mathfrak{B}_i$ is the pullback of all of the lattices through which it factors, and

$$(\mathcal{O}(\mathcal{l}))_i \simeq (\mathcal{O}(\mathcal{l}))_j$$

and

$$(\boldsymbol{\ell}^{-1})^{-1} = \boldsymbol{\ell},$$

where the equals sign denotes a strong equivalence, such that[16]

$$\mathcal{l}^{-1} \simeq \widehat{\boldsymbol{\ell}} \simeq \mathcal{l}^{-1}$$

and $\mathcal{l}^{-1} = \mathcal{O}(\mathcal{l})$.

Thus, a supersite is, again, a space which is:

a. well-inside itself
b. well-inside some frame **F**
c. way above **F**,

where by way above ($\gg$), we mean that,

§Df.8 given a $\mathscr{W}$-locale X and opens U,V:$\mathcal{O}$(X), U is said to be ***way below*** (resp. **way above**) V if (again, as per [Pat]),

$$\prod_{(I,f):Fam_W(\boldsymbol{\mathcal{O}}(X))} (I,f)\ directed \to V \le \vee(I,f) \to \exists_{i:I} U \le f(i),$$

resp.

$$\prod_{(I,f):Fam_W(\boldsymbol{\mathcal{O}}(X))} (I,f)\ directed \to V \ge \vee(I,f) \to \exists_{i:I} U \ge f(i)$$

[16] Morally, $\mathcal{l}$ "homotopically dominates" $\mathcal{l}^{-1}$

§E5 In other words, the relation a≫b means that b is compact *relative to* a. Thus, for the supersite, we have an identification

$$\mathcal{W}_{\mathrm{i}} \ll \hat{i} \ll \mathcal{W}_{\mathrm{i}},$$

where $\hat{i}$ is non-trivial, i.e. the universe $\mathfrak{U}(\hat{i})$ is strictly non-identical to $\mathfrak{U}(\mathcal{W}_{\mathrm{i}})$, and therefore there is an ultrafilter $\boldsymbol{\omega}(\mathcal{W}_{\mathrm{i}},\mu)$ through which the idempotents (in this case, *inaccessible (*though not inadmissible)[17] *cardinals*) pass through that allows one to recover the topology of rep$(\hat{i})$ in a canonical way.

§Pn.1 (Balanced) supersites are *Stone locales*.
§Pf. See [Pat, def. 3.17]

§E6 Another way of thinking about supersites is that they retrieve the data of *Scott continuous* covers of frames [CoC] which contain the information of globally separable universes with distinct spans. These need not be geometric or topological in nature, but they do have fundamental geometric and topological representations.

For instance, $\mathbb{N}_0$ is the *critical point* of the *balanced supersite* $\mathbb{Z}^+$*;* as such, it is *co-reflective* of those elements outside of its algebraic closure ($\mathbb{N}_0^\circ$), which are globally (although perhaps not locally) continuous. Thus, rep($\mathbb{N}_0$) receives its homotopical realization as a *basepoint* for the loop

$$\mathcal{S}^1 \cong \mathbb{Z},$$

and there is some gerbe **G** for which the slice category of $\mathbb{N}_0$ is representative of.[18]

§Pn.2 For a supersite $\boldsymbol{\Phi}$, there is a ring of polynomials containing either a *supercompact* or a *measurable cardinal*. For such a cardinal, there is a *Galois connection* to the *base points*

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[17] Succinctly, a cardinal is *admissible*, but not *accessible* if it is a member of the closure of an open set which is homeomorphic to an interval in which it is one of the endpoints. We denote this element by λ_σ.

[18] Although one should not educe immediately that $\mathbb{N}_0$ is a *generator* of any of the rings about which **G** acts by translation, it is safe to assume this is the case up to isometry.

of a field $\overline{\mathbb{F}}$, which receives a geometric representation as an n-cube/sphere.

§Pf. Let λ_σ:rep($\boldsymbol{\Phi}$) be a critical point (i.e., zero ideal) of the field $\mathbb{F}$. By expansion we may write $(\lambda_\sigma)^{k}+(\lambda_\sigma+p)^{kx}$, say, which has its zero when both of (λ_σ, p) are zero ideals. Suppose instead that we let λ_σ be an imaginary number, and k even.

Then, there is a covering sieve f:$\pi_0(e^{\pi ik})\pm x$, which has as a pole $\frac{1}{p^q}$m, an effective divisor of some analytic variety of rep$(\boldsymbol{\Phi})_{\dim(q)}$.

Thus, we have shown that there is a complex locus at which the potential gradient for the **π**-weights of $\boldsymbol{\Phi}$ vanish. Thus, we have proven **§Pn.2**; we have shown that the Dirac delta function is infinite for a connected pair

$$\Gamma(\lambda_\sigma, \sigma^\lambda),$$

and so it is shown that λ_σ is either *measurable*, or *super-compact*, and σ^λ belongs to a field with p-adic representation in the presentable category $\mathbf{Spec}^{\mathrm{Top,Geom}}$.

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En al la ĝangalon

"Neniam komercu fenikso, por ĝia cindro"

"Never trade a phoenix,
for its ashes."

♪ Claude **Debussy**, ***<u>Rêverie</u>***

I Thessalonians 1

§Ĝan1 In classical *shape theory*, there is this conception of ***movability***. *Shapes* may be movable; *compacta* may be movable; *morphisms* may be movable. It would seem that this property (of being movable) would be so important as to warrant an investigation. So, it is now that I shall attempt to understand it.

§Ĝan2 When Dydak and Jimenez [Mov] considered their shapes, they restricted themselves solely to those spaces which were "metric compacta." This particular motivation sprung about from considering an offshoot of shape theory which involves a further layer of convolution[19]

$$\nu:\ id_{\mathcal{S}_{\{*\}}} \Rightarrow \mathcal{S}_n^q$$

from the homotopy of a shape to an "n-homotopy[20]," and is hence known as "***n-shape theory***."

§Ĝan3 We now work to understand the ideas of shape and n-shape theory.

§Ĝan4 Let us travel back to 1980, where, it is said by Borsuk & Dydak that,

"The aim of the theory of shape is to study the global properties of spaces, neglecting the complications in their local structures… one gets such an approach… if one replaces

[19] Notacio mia propra

[20] C.f. *classical shape theory*, which extends the ordinary theory of homotopy. Recall here that shape theory was introduced by K. Borsuk to deal with *metric compacta*, whereas *n-shape theory* was introduced by A. Chigogidze. The original theory of Chigogidze was established in order to work harmoniously with the *universal Menger curves*, but despite its brilliance remained limited; it has been extended by, i.e. [nSh] to handle all classes of Hausdorff compacta.

[classical homotopy theory] by 'a more elastic' concept of fundamental sequences." -[nSh, pg. 5]

First and foremost, what one needs to understand is that Borsuk worked during a time in which *retraction* was still a rather new concept in algebraic and (specifically) geometric topology. Among the results motivating his journey was:

§Th.1 (*West,* pg.99) "*Every ANR-space has the homotopy type of a polyhedron*"

where, by "ANR-space," it is meant "absolute neighborhood retract space," and where an absolute neighborhood retract is defined by:**§Df.1** Let **Y** be a metrizable space. If, for every space $\mathbf{X}\in\mathbf{M}$

containing **Y** as a closed subset, **Y** is a retract of some set of neighborhoods $\{\mathscr{U}(\mathbf{Y}_i)\}_{i\in\mathbf{X}}$, then **Y** is an ***ANR***, and we write $\mathbf{Y}\in\mathbf{AR}(\underline{\mathbf{M}})$.

The following result is well-known:
§Th.2 Every convex subset of any linear normed space is ANR.
§Pf. Consult [nSh], pg.3.

§Ĝan4 Thus, it is so that one of the fundamental motifs of shape theory is to lift specialized cases of ANRs to their (essentially) categorified counterparts. For instance, **§Th.2** says in other words that there is a canonical isomorphism

$$(\mathbf{Conv}_\alpha \in ||\mathbf{A}||) \cong \mathbf{AR}(\underline{\mathbf{M}})$$

or better yet,

$$\forall\{X,Y\} \in P;\ \mathbf{Hom}(x \in \vec{X}, y \in \vec{Y}) \cong \mathbf{AR}(\mathrm{rep}(\underline{\mathbf{P}}))$$

Which is to say that for solid, linearly independent vector spaces with a common locus, there is a non-wandering neighborhood about the origin which is a root of the determinant of the fundamental Weyl chamber; thus,

$$\alpha \in \overline{X}^{W} \cong Ran_X Cat(Shv(X)),$$

such that some object (germ) in the ***highest weight category*** of a system of categories and their Kan extensions receives a fundamental representation as a fiberwise retract into the preimage of the complex.

So, effectively, for all polyhedra, there is a homotopy type given by the composition of maps f ∘ g from mutually homotopically dominant spaces X and Y such that there is an effective equivalence between the two, for which I denote $X^{E}Y$. In the localic case, one has that

$$\mathbf{AR}(\underline{\ell}) \simeq (X^{-1},Y^{-1}) \simeq (\pi(X,Y))^{-1};$$

X and Y are separable, are Stone spaces, and, given the axiom of choice, there is a free generator **b** which gives us the supersite

$$\ell_{b} \coloneqq \mathbf{AR}(\underline{\ell}) \rightarrow \pi(X,Y) \rightarrow \ldots \rightarrow \mathbf{AR}(\underline{\ell})$$

One can, rather than think of the supersite as an exact sequence per sé, convince themselves that it is a sort of totally b-connected set of birational torsion points, whose proper valuation $b_{||}$ is given and enriched by the motivic action of (without loss of generality, and assuming Y inside X) Y/b. Morally, this is given in terms of modal semantics by ◇Y≃□X.

Thus, as Mochizuki [Ali] says, one has "license to confuse" the phase space $e^{i\pi^{b}}x$ of **X** with some isogenous space **Q**; say, a Hilbert cube, which is "well-inside" itself, such that

$$e^{i\pi^{b}}x \ll \Diamond Y \simeq \Box X \ll \Box Y \simeq X$$

holds, and therefore we recover the short spectral sequence we began with. Let us denote this sequence by **S**.

§Ĝan5 Let ***ϴ***~**S**, with left-hand and right-hand side "mutually alien copies" [Ali], and write $\boldsymbol{P}\tilde{\sim}S^{W}$ for the "highest weight category" of the necklace

$$\mathbf{Nec}(x) \simeq \Delta_{\tau\leq b}(\ell\vee\ell^{-1}).$$

Denote the left-hand side U, and the right-hand side V. Say that this is a *necklace of representative generators* if the following hold:

- よ[21](U,V) is a sieve of covers of clopen objects in **sSets**
- There is a frame-map from the the atlas of lat(U) and V,

  and denote the transition map V → U by $\varphi\colon id_{U} \circ id_{V}^{-1}$

[21] よ being, of course, the Yoneda embedding

- The set of eigenvarieties of V is isomorphic over the moduli space of facemaps from U into itself,

and note that the three are, in this context, equivalent. In particular, the second statement says that every $U^{sub^{-1}}$ is a *spectral locale*, with a reciprocal in the A_∞-space of rep(V).

§Ĝan5 To retract (pun unavoidable) our discussion, we now define *movability*;
§Df.2 *(Dydak-Jimenez)* a "shape" (roughly speaking), **P**, will be called here ***movable*** in **Q** if, for every neighborhood **U** of **P**, there is a neighborhood **V** of **P**, such that for every neighborhood **W** of **P** lying in **Q**, there is a map

$$g\colon \mathbf{V} \to \mathbf{W}$$

such that

$$g \simeq \mathrm{id}_V \text{ in } \mathbf{U}$$

§Ĝan6 Let $\mathcal{S}_{\{*\}}$ be a contractible shape of dimension p. Then, we shall call $\mathcal{S}_{\{*\}}$ a *p-shape*; and, if it is movable, it is a *movable p-shape*. We will write $\boldsymbol{\mathcal{S}}^{p}_{\{*\}}$ where the dimension of the shape needs to be explicit. For p,q not equal, say that $\boldsymbol{\mathcal{S}}^{p}_{\{*\}}$ is *q-movable* if it is movable in rep($\boldsymbol{\mathcal{S}}^{q}_{\{*\}}$).

Then, there is a lifting of theories:

Shapes → n-Shapes

such that the definition of *movability* is enriched by weakening the notion of p-movability of a shape $\boldsymbol{\mathcal{S}}^{p}_{\{*\}}$ to q-movability, as follows:

$$\begin{array}{c}\mathrm{Mov}(\boldsymbol{\mathcal{S}}^{p}_{\{*\}}) \hookrightarrow \mathrm{Mov}(\boldsymbol{\mathcal{S}}^{p}_{\{*\}} \hookrightarrow \boldsymbol{\mathcal{S}}^{q}_{\{*\}}) \\ \cong \\ \{\mathscr{U}(\mathbf{Y}_i)\}_{i\in \mathbf{P}} \hookrightarrow \{\mathscr{U}(\mathbf{Y}_i)\}_{i\in Q}\end{array}$$

the fibers of $\boldsymbol{\mathcal{S}}^{p}_{\{*\}}$ are accordingly replaced with retracts of $\boldsymbol{\mathcal{S}}^{q}_{\{*\}}$; the sheaves Shv($\boldsymbol{\mathcal{S}}_{\{*\}}$) are replaced by Shv($\boldsymbol{\mathcal{S}}_{\{q-p\}}$) and are given q-p degrees of freedom. Correspondingly, if rep($\boldsymbol{\mathcal{S}}^{p}_{\{*\}}$) is an orientable manifold, then it is orientable in $\boldsymbol{\mathcal{S}}^{q}_{\{*\}}$ with q-p rotational dimensions.

§Rm.1 Examples of shapes that are p-movable but are not movable p-shapes, and vice versa, are given in [Mov]; for clarity, we will

§Df.3 call a shape "**portable**" if it is both *movable in p* (p-movable) *and* it is a *movable p-shape*.

§Df.4 Say that a category $\mathcal{D}$ is **encompassed** by a category $\mathcal{C}$ if it is an object (full subcategory of) and $\boldsymbol{\delta}$-small within $\mathcal{C}$, for some choice of measure μ. Call such an object $\mathcal{C}$ the "compass" of $\mathcal{D}$, and say that $\mathcal{D}$ is $\mathcal{C}$-traversable.

§Rm.2 If R is encompassed by S, then an equivalent statement is to say that R is $\mathfrak{U}$-small; i.e., $\mathfrak{U}(R)=S_{\mu}$. If the elements of R are dense within S, then R is *continuous with respect* to the measure on S.

§Ĝan7 If a category R is totally Abelian, and Cartesian closed, and hence a monad, then it is **locally portable**; all of its associated subgroups, i.e. left/right cosets, are thereby portable. If it is encompassed by **S**, and **S** is *globular*, then **S** is the *parent category*. That is to say that R is *strictly finer* than **S**; mappings into **S** are monotone, and R inherits the q-movability and $\mathcal{C}$-traversability of **S<T**.

If R is locally portable, and S is locally portable, then R is *portable*.

§Th.3 Suppose $\mathcal{Z}$ is a q-groupoid, and $a\in\mathcal{Z}$ is a monomial. Then, there is some ring c which is portable in $\mathcal{Z}$.

§Pf. Let $\mathcal{R}/a$ be the absolute Galois group of a inside $\mathcal{Z}$ with connection $\Gamma\{a\}_i \to b\in(\mathcal{Z}\vee\mathcal{Z}')$. Then, it follows immediately that $(g{:}a\to b,a,b)$ is a monad, and hence, locally portable.

Say we are interested in the case where there is a map $c\to rep(c)$, where rep(c) locally resembles $\mathfrak{R}^{2=q}$. Then, c is *locally portable* in $\mathfrak{R}^{\infty}$. Then, we have that

$$\lim_{q\to\infty} \boldsymbol{\mathcal{Z}} = \mathfrak{R}^{\infty},$$

and thus, $\mathcal{Z}$ becomes an infinity groupoid whence all of the representations of {a,b} are locally portable; and thus, there is some ring

$$c=\mathbb{Z}[a] \subset d=\mathbb{Z}[a\cup b]$$

which is portable in $\mathcal{Z}$, such that all of the ideals of a are locally portable, and therefore

$$ideal_d \leq max(ideal_d)$$

and by downwards closure, c<d is portable. Q.e.d.

§Ĝan8 One question which is immediately spurred by the previous result is whether or not there exist monads which are not portable. If so, is there a simple recognition principle which would allow us to spot one of these, so-to-say *stagnant*, or *complacent*, or *sessile* monads?

§Th.4 There exists a complacent monad.

§Pf. Let $\mathcal{H}=(\mathbb{R}\backslash\{0\},+,\mathbb{R}')$ be the finite real numbers under addition excluding zero. Let the measure of $\mathbb{R}\backslash\{0\}$ be equal to one and the measure of $\mathbb{R}'$ be some f>1.

Then, $\mathbb{R}'$ is strictly larger than $\mathbb{R}$. We have that

$$\boldsymbol{\mu}(\mathbb{R}')-\boldsymbol{\mu}(\mathbb{R}\backslash\{0\})=k=f-1$$

Thus, $\mathbb{R}\backslash\{0\}$ is k-movable, and it is a movable 1-shape; since 1<k, it is also portable, at least locally. Thus,

$$\mathfrak{U}(\mathbb{R}\backslash\{0\})$$

is well inside

$$\mathfrak{U}(\mathbb{R}'),$$

and thus

$$\sup(\mathbb{R}\backslash\{0\})=r'<r''=\sup(\mathbb{R}').$$

Let us now define a sub-monad, **J**. Say that **J** consists in those elements r which are well inside $\mathbb{R}\backslash\{0\}$. Then, we obtain a semigroup $(r,\mathbb{R}')$ under addition. Call it $\mathbf{J}_{grp}$. Because every character r *names* a space which is well inside $\mathbb{R}\backslash\{0\}$, and because $\boldsymbol{\mu}(\mathbb{R}\backslash\{0\})=1$, we have that r+r' has a maximum

$$\max(\boldsymbol{\mu}(\mathbb{R}\backslash\{0\})+\boldsymbol{\mu}(\mathbb{R}\backslash\{0\}))=2,$$

and thus

$$\boldsymbol{\mu}(\sup(\mathbf{J}_{grp}))=2\leq f,$$

and so if f=2, then

$$\mathfrak{Mon}_{\mathbf{J}}$$

is not portable because it is not 2-movable.

Thus,

$$\max(\mathfrak{U}(r'))=\max(\mathfrak{U}(r''))$$

which would be a contradiction, and so $\mathbf{J}_{grp}$ cannot be both **J**-small and well inside itself. **Q.e.d.**

§Rm.3 It should be noted that this proof is sloppy; I am unsure as of this writing how to strengthen it, but I am confident it is true.

§Ĝan9 To say that a monad is *complacent* is stronger than to say that it is "not pyknotic." For a monad not to be pyknotic, it would have to have all of its colimits preserved under pullback, but not pushout. Essentially, this translates to an object which is 2-small (tiny) but not well-within itself. For a monad to be complacent means that it is also not well-within any compass $\mathcal{K}$ which parameterizes its phase space.

At the risk of mixing metaphors, to say that $\mathcal{K}$ "parameterizes the phase space" is essentially to say that the Lagrangian of some quantization window is not Lebesgue measurable, where by *window* we mean:

§Df.5 for two or more spectral toposes sharing a meet, define the meet to be a *fixed point* if there is a refinement

$$\mathrm{ref}(\bigwedge \mathrm{spec}(t)) \in T_{\mathrm{fam}(k)}$$

for a k-family of stalks; say that a *fixed point of a spectral topos* is a *window* if there is a map $\mathbf{\Phi}_{\mathrm{eff}}$ from each of the T-indexed fibers about every k to a nexus **n** of a supersite **S**.

§Ĝan10 Note that every complacent topos is indeed trivially perfect, and every complacent monad is a complacent topos equipped with an involution. One should not confuse the notion of a *perfect topos* with a *condensed* (class of) *toposes*. Indeed, there exist condensed classes of toposes which are not perfect; for instance, take the discrete set [0,1] with the ultrafilter

$$X:[0,1] \rightarrow \mathfrak{U}(G\supset([0,1]\times[0,1])),$$

G continuous. Then, one has that its 2-categorical realization as a totally disconnected pair of inner horns admits no animation of the form

$$k_{anim}\times k_{anim} \rightrightarrows \mathbf{S}\mathrm{uper}\{*\},$$

thus there is no refinable coset *X* with “enough” injectives for descent.

§Ĝan11 In every such case where the animation X does not take as its input bi- or even poly-rational points, it will fail to produce any sort of coherent or even quasi-coherent skeleton, and thus as a matter of routine, one needs only check the number of compasses about the sub-objects which X acts on in order to deduce that it is imperfect. So, in the spirit of laziness, I will not prove the conjecture

§Pn.1 Small categories with no Pontryagin duals are imperfect,

where by “perfect” we mean that the class of totally disconnected integral regions are bounded by some curve which is homotopic to a hypersurface in G^{-1}.

Thus, always when we speak of a set as being “perfect” we tacitly presume that it *its animation* has as its *inner model* a field which is *locally portable*. So, it is the case that some *condensed* and even *pyknotic* structures are not even *locally portable*, in which case they are automatically sessile, and in which case they are automatically complacent. Thus,

$$\begin{array}{ccccccc} \text{Sessile} & \subset & \text{Complacent} & \subset & \text{Non-pyknotic} & \subset & \text{Non-Hausdorff} \\ & & \cap & & \cap & & \\ & & \text{Perfect} & \subset & \text{Condensed} & & \end{array}$$

so that a sessile *double category* [DC, pg.52] is *impotent*, such that it has no vertical or horizontal double functors; there is no

$$\mathbb{M}\mathrm{nd}(\mathbb{D}) \to \mathbb{M}\mathrm{od}(\mathbb{D}).$$

The “pasting conditions” (ibid), if they exist, enucleate any form of coherence from the ambient multiverse under any and all quasi-metrics, let alone metrics, and therefore the perfection

$$\mathbb{P}\mathrm{erf}(\mathbb{Q}_{\mathrm{sess}}) \simeq \mathbb{Q}^{\pm\infty/k}$$

is completely non-traversable anywhere else but the self-contained site of the homologous action

$$\omega^{-||} \cong \mathrm{dess}(\mathbb{Q}_{sess}).$$

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Juvenalia I

"Let us leave theories there and return to here's hear…" -James Joyce, Finnegans Wake

§**Juv**1 Poor do I stand;
Bombastically do I decree
myself
to be
humblest of all

§**Juv**2 Poor do I stand;
in wake do I repart;
Docile yet as the fe(r)verous action
Further,
Yet has forever exacted

§**Juv**3 I write –
"Where is my joy?"
Let alone suffering;
Where are my truffles
And whence do I regain
myself

§**Juv**4 Long trodden are the ways of forevermore
As the ravencroft tarmac strewn about
Wherever last sufficiency
Whenstever now or evermore

§**Juv**5 Thy guillotine reign,
down to every last petrichor,
the last shall now be nigh;
yet, who is it, that is, what am I?

§**Juv**6 Poor do I stand,
ought but a humble serf
in wake do I repart?
I pause to deduce.

§**Juv**7 For there lies a wake a night;

there shall come a day
faint traces of a cinema, flicker in the mind

Senfina ludo

♪ **Iberia** ~ Almería | Harbinger of the mundane

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§**Juv**8 I was rebuked by a young man named Joshua when it came about that I attempted to explain myself; particularly, I was there trying to justify my writing, and more acutely to the point, on Kan extensions. The following concept:

“**complex**”

was utterly foreign to him; it was as though he did not speak the English language. He wondered the following:

“**Which category are we working in?**,”

to which I replied,

“**The category of Kan complexes**.”

Yet, this did not appease him. He said to me, “math is not an infinite game;” it is a place where one goes to build a tower and ramparts, starting from the single brick laid at the bottom, and progressively, one develops a sufficient foundation to continue escalating their constructions. Mathematics then becomes a castrated sort of thing; a spayed beast which is kept in the classroom, countered to a flat line from start to finish.

If this were so, how would it be the case that any divergence should occur?

Tell me, how does a stick grow perfectly straight? How does the tree grow bald since birth?

Arrogance is the envy of the self-appointed tyrants who seek refuge in the leaky silo of humility. One should not be so brazen as to exchange himself for moribund confidence.

§**Juv**8 The monk does not resent his place in life. He does not loathe; he does not seek refuge from his calling. He does not scoff; nor scowl. His ways are at once pathetic, and formidable. He unites that which is within reason, and that which is without cope; under him, all actions are culpable.

§**Juv**9 It is not merely money which is the measure of a man’s wealth; nor is it happiness; it is, in general, currency. The trains of pulses; clicks; chirps; the vibrations of his devices which alert him to new information, and social status updates; the daily rhythm of the meandering pigeons which allow him to glimpse the routine of an animal beyond himself; to be certain that he has lived yet another day.

§**Juv**10 Like the ticks of the clocks does our present activity, and indeed every nerve of our being (as a thing here and now) is a mere token, which is to be taken up by the transitory migration of our life-force as it passes from one moment to the next. Where we are now “*the* time,” as in when we ask “what time is it right now?,” so do we really, *tacitly* mean “what is *the time*?,” ***we***, collectively and as an actual and static byproduct of our underlying motivic forces, become merely a vestige, or a remnant of the true capital-T ***TIME*** which passes through our veins.

It is dumb, backwards, lame, and mistaken to believe time as an *empty vessel* in which the privileged and mechanistic physical universe enacts itself. It is far greater yet to think of the **physical universe** as *consisting* <u>not only</u> *in* time, but <u>*of*</u> time. Time is the supertype in which all of the proper types of places, as we speak of them most commonly, are arranged.

Thus, we are but clocks; our momentary instantiations, our spoken Tao, are then placeholders, taken up for temporary purposes of transitory migration and timewise dissolution.

§**Juv**11 Call a nameable thing a token, and say that that the abstract *psychological stratum* which encapsulates or encompasses its properties is its type. The token, the divisor, is subordinate to the numerator, depending upon its annihilation to birth its children into existence. Therefore, the ability of the numerator to destroy itself recklessly; to obliterate itself, so that it may bring life to a new number, a quotient, is a *power* of the numerator chiefly.

Thus

$$\mathbf{pow: Gestalt \rightarrow id}_{\mathrm{thing}}$$

is the *tic*, the *checkpoint*, the *moment*; and so it is then that the individual, being merely a token of humility as a whole, has as its universal property that it is a *power* of the universe in which it resides; chiefly, the power to divide said universe by its actions, and produce itself.

§**Juv**12 Things in-and-of-themselves are *spectacular*[22]; their relationship between Time and the times is *powerful*; the *fantastic* and illusory "time dimension" evades the "norm of the one;" for, time is not one, but many; it is only Time which is one-but-many.

§**Juv**13 For time has at its mercy the power to make moments, in the lives of men, it is not alive, but *super-alive*; thus, the subpowers consisting in each and every confined place, and each and every confined moment, is 2-small; it is tiny in the sense of Time.

§**Juv**14 Suppose that the following is a monotonically decreasing chain of universes:

$$\textbf{Time} \supset \textbf{Life} \supset \textbf{Events} \supset \textbf{Details}$$

Then, time has as its power each and every one of its animals; the animals have as their powers the events within their will; the events have as their powers their intricacies and minutia. Then, as a matter of speaking, men have as their *subpowers* the *details of their actions*, which have as their *superpowers* the actions themselves.

Thus, man is the superpower of his actions, and time the superpower of all men.

§**Juv**15 In my past thinking, I have distinguished between the incorporeal well of potential, or more appropriately *sea of types* governing the poles of an agent (or more loosely, *actor*), and its body as is discernible within the realms of physics. The former, I have called the *aura* of a thing, and the latter the *animal*.

I have explicitly attempted here to blur the lines between that body which bio-psychosociology concerns itself with, and Timetypes as a whole, which are animated in a pseudo-causal manner in just the same way as all things, and are thus under my view "living," in the sense that they experience a local evolution of their identity.

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[22] Read: *stereotyped by* "the spectacle;" see Guy Debord.

By "pseudo-causal," I mean that which is perfectly and ultimately correlated at every seam, but which cannot be deduced to be causal. Thus, if we assume that correlation does not imply causality, then there is nothing but a one hundred point correlation as the ceiling, and thus two things may only ever be said to be correlated.

More to the heart of the matter, I used the term "inspired." Thus, inspiration is the power of all things encompassed by and movable as Time, and the individuation of their identities is always *made of* and *made by* the interaction between Time and its animals. This harmonious relationship would seem to be ultimately generative, and thus if anything has a semblance of meaning to it, it is then the prime *meaning-making* phenomenon underlying the whole of that which typically arises.

§Juv 16 Inspiracío det primum mobilis.
§Juv 17 Sen mobilium, sed vascellum stasis.
§Juv 18 *Forma anprobieren*; je suis *formstmachen* über la *languid*, über la sessile, no necesesariamente *über* diese *Dingen per se,* aber *über* ***absolvi*** auf dem.

§Juv 19 The *horloĝo eternal* estas proxime la *horloĝo* de la *Eternalus*. Skribe:

$$\widehat{\mathcal{C}}_{\mathrm{finite}} \in \mathfrak{U}(\aleph_{\omega}^{\infty}) \coloneqq \oint_{super} \frac{\partial\omega}{\partial(\omega_i/\omega'_i)},$$

kie, i estas indexado al momento de la (kaj sur la) *subtypes* de la bestoj; kaj la vestoj estas la bildo de la *Animo*, kio estas dira, la *Animó* estas *inaccesi* de la loko de la *bestoj*, el kiu ĝi estas prezentit.

§Juv 20 The moduli space of $\mathfrak{U}(\aleph_{\omega}^{\infty})$ (in a very informal sense of the word) *encompasses* all those atlases and their charts which are *conformal*; read: which conform to the spectacular.

§Juv 21 There are but three types of "things;" two always of one kind, and the other of an opposing kind; they are, "empathogens," "perceptogens," and "synchrons."

It is the empathogen which is soft; the perceptogen that is hard, and the synchron which makes the soft firm. Thus, the synchron is that component which allows for descent from *firmament to firmament*; it is the synchron which unites the powers of perception, and the superpowers of perception; which unionizes, or better yet, *intersects* that thing which makes perception into a subtype with those granularities which are endowed morphology by the same.

So, always, there are two like kinds, and just one unlike. If A is unanimous with B, then A and B are *resonant*, and C *dissonant*; thus, the set {A,B} is *diffeomorphic* (in the sense of Langan; read: *syndiffeonic*) with *C*. For the purposes of integrability, this property (of relevance to, or kinship with) *is not transitive*; if A is *resonant with B*, and C *dissonant*, it is not necessary, or even usually the case that C and B must be co-dissonant with one another. Indeed, it is this supreme "topological glue," this joint phenomena by which the contra-aspects of competing likenesses are cohered, and placed together in a cohesive model, which is the origin story of the synchron.

§Juv 22 Where, the body feels agony, and is destroying itself in exercise, it is rebirthed, renewed, and the contraction of the muscles met with further expansion. So too is it that the competing likenesses of *fantasy* and *spectacle* must be co-adjoint ends to one in the same being; the *specter*.

I will comment here that the language of Esperanto is quite neat, in that it allows us to think more clearly about these things. For instance, "*animo*" means soul, where in English we use some phrase like "anima;" yet, "*besto*" means "*animal*" (reified animus); better yet, "*vesto*" means clothing; so, {b,v}esto is that thing which is at once dichotomously a living and materially real being, and a mere cloak for something utterly transcendent, quixotic, and beyond the differentiation of *telic specialization*.

§Juv 23, So, to recapitulate, the evidence for the existence of a *synchron* is abundant; it is more-or-less the fundamental unitary "particle" of Time which synchronizes clock to clock, and moment to moment, by which the gravitational and relative action of mass is stabilized and kept within the temporal universe. They are the peacemaking packets which relate the grand, prime Relatum to the subordinate *relata*.

§Juv 24 I must now depart. I do not have the will or the stamina to carry on this topic much (or any) longer. It is a bittersweet sentiment; perhaps even melancholic, to reach such an impasse, or to grow bored (yet not satisfied) with a discussion I find myself so passionately involved in.

---

trankvila revado.

---

§Juv 25 I will say here that as of the time of this writing, it is 2:48 A.M. on a Sunday.
§Juv 26 I will say here that as of the time of this writing, it is 2:50 A.M. on a Sunday.
§Juv 27 I will say here that…
shall I go on?
Or shall I cease
Shall I toil,
Or shall I rest?
Much of the time,
I am unimpressed
Other times
A fateful regress
Shall I stay clothed
Or undress?
Perhaps a warm bath is due.

I rarely take a bath these days; much more often I will shower; I can adjust the temperature of the water on the fly; I do not have to lean up against the icy cold back portion of the tub; etc.

There are several spiders (daddy long legs) living in my shower.

At some point, there was only one.
It died.
Where did the others come from?
Did they creep in, through the walls? Did they climb the staircase?

Goodbye.

♪ **Schubert** (arr. **Liszt**) - **<u>Schwanengesang</u>**, D. 957: No. 4, Ständchen (Serenade)

Playing badminton with the seagulls.

※7

Hopf estis ĉi tie

♪ **Chopin** - Nocturne in C-Sharp Minor, Op. Posth., B. 49

§**Hop1** Suppose that we have a set $\mathbf{\Pi}$ with self-maps $(\boldsymbol{\pi}^{\boldsymbol{\pi}})_n$, where n is the once-truncated homotopy group of the ANR-set of every $\boldsymbol{\pi}_i$. Further, suppose that we are interested in lifting these i's to some crystallographic subgroup of **SU**(n), but we do not want to work with matrices. One popular strategy is to use a small category:

$$\mathbf{Graphs} \subset \mathbf{Hypergraphs}$$

whose universal property is that there is a covering map

$$\Gamma_{ij}\colon i_\Gamma \rightarrow i_\Gamma$$

from each and every vertex $p \leq \Gamma$ into an adjacent $p' \leq \Gamma$, with the condition that p' may equal $\mathbf{id}_p$.

Roughly speaking, this covering is *global*; i.e., it is an n-topos, where n in this case is equal to $|\pm\Gamma|$. Thus,

$$\Gamma_{ij} \simeq \mathfrak{U}(\mathrm{Hom}(p,p_k)),$$

and every morphism in the homset of p,p_k is called an *edge*, or from the hypergraph-theoretic perspective, a *1-edge*. Roughly, if we stabilize the underlying topos of Γ_{ij}, we get a $(\Gamma,1)$-topos which is *fixed* inside of some "hyperization", which is then a (Γ,Γ')-topos, with one of Γ,Γ' possibly equaling infinity.

For a *t*-morphism between (Γ,Γ')-toposes, with *t* equalling $\inf(\Gamma,\Gamma')$, we say that the source p and the target p_k are *t-coincident* with one another, and if t=1, we simply say they are *incident*.

Then, if A and B are respectively left- and right-objects in a full subcategory of **Grp**, we shall say that such a category is isotopic with a graph i_Γ if:

a. the *covering map* Γ_{ij} is a frame map
b. $i_{\Gamma\rightarrow}(i_\Gamma)^{-1}$ is *exact*, and its image is *well within* a locale generated by $\boldsymbol{\pi} \in \mathbf{\Pi}$

and

c. There is an isotopy between the self-maps of $\mathbf{\Pi}$ and the *modified* (i-truncated) *Hoschild homology* of the reflective $\mathbf{\Pi}$-type:

$$\boldsymbol{\pi}^{\boldsymbol{\pi}} \simeq \sum(-1^{2\boldsymbol{\pi}+p-i})p_i$$

such that, roughly speaking, $\boldsymbol{\pi}$ *lifts to* $\mathscr{P}\mathbf{\Pi}$:

$$\pi^{\#} \simeq \pi^{\pi}$$

§**Hop2** Note that the graph i_{Γ} is a *full subcategory* of **Graphs.** That is to say, its universal property is inherited by the type inclusion

$$i_{\Gamma}:\mathrm{Fam}(\mathbf{Graphs})$$

so that all of the adjunctions, i.e. coincidences of a *distinguished* (i-truncated) *complex* are preserved and encompassed by **Graphs**. Thus, i_{Γ} is *portable* within Map(**Graphs**).

§**Pn.1** Suppose that i_{Γ} is the Cayley graph of a group G. Write:

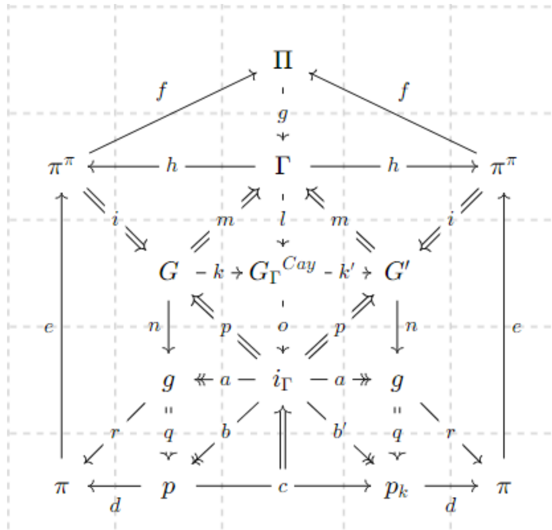
$$G_{\Gamma}^{Cay}$$

It follows immediately that one may obtain the desired crystallographic subgroup as yearned for by first setting G to be equal to SU(n), and then bounding a particular discrete neighborhood of (co)incidences.

§**Pf.** Diagrammatically, we get a sort of *house*:

$$\begin{tikzcd}
 & & \Pi \arrow[d] & & \\
\pi^{\pi} \arrow[urr] \arrow[dr, Rightarrow] & & \Gamma \arrow[ll] \arrow[rr] \arrow[d] & & \pi^{\pi} \arrow[ull] \arrow[dl, Rightarrow] \\
 & G \arrow[r] \arrow[d] \arrow[ur, Rightarrow] & {G_{\Gamma}}^{Cay} \arrow[r] \arrow[d] & G' \arrow[d] \arrow[ul, Rightarrow] & \\
 & g \arrow[dl] \arrow[d, Rightarrow] & i_{\Gamma} \arrow[l, twoheadrightarrow] \arrow[r, twoheadrightarrow] \arrow[ul, Rightarrow] \arrow[ur, Rightarrow] \arrow[dl] \arrow[dr] & g \arrow[d, Rightarrow] \arrow[dr] & \\
\pi \arrow[uuu] & p \arrow[l] \arrow[rr] & {} \arrow[u, Rightarrow] & p_k \arrow[r] & \pi \arrow[uuu]
\end{tikzcd}$$

Then, we *name* every functor and natural transformation of the house:



We have a symmetry b = q ∘ n ∘ i ∘ c ∘ d = id_{p,p_k} which may be defined in terms of a coz-module structure; i.e., the *cozero* parts of *Π* are *passed down* by the chain of dependencies

$$\Pi \supseteq \Gamma \supseteq G_{\Gamma}^{Cay} \supseteq i_{\Gamma} \supset p$$

where $(G_{\Gamma}^{Cay})^*$ strongly models the Lie algebroid of SU(n), and where we denote by X^* that X is a *transitive inner model of* the principle n-group over which its filtrations project.

□

§**Hop3** Write $\partial Co(G_{\Gamma}^{Cay})^*$ for the boundary of some neighborhood $\mathscr{U}_{Cay}$ of the Cayley graph of G. Define a function $f\colon \mathscr{U}_N \mapsto f_{Gau}$ mapping from the convex region of a neighborhood N to the interval [0,1], and put $\mathscr{U}_{int(Cay)} \mapsto \max(f_{gau})=T\sim\frac{1}{b}$.

This function maps the interior of some *preferred region* from the graph, and more loosely a *preferred subset* of our Π-set onto the highest possible truth value. Moreover, this function parameterizes a certain ***portable shape*** as a (trivially) privileged relativistic frame under which the truncation of the entropy measure is minimal. That is to say, the elements of this neighborhood may be written as

$$\Box\pi$$

and elements outside of the neighborhood can be written as

$$\Diamond^q\pi.$$

Here, q is the result of multiplying the norm of the metric on the total space of Π with the *implicit distance* of the distance from any $\Box\pi$-element.

Because every $\Box\pi$-element is distance zero from itself, we have that

$$\Box\pi = \Diamond^0\pi$$

and we regard the geometric realization,

$$||\pi|| = \mathrm{rep}(\pi)^\circ$$

to be synonymous.

§**Hop4** Write $Pol(\pm\pi)$ for the curve of norm 1 "swept out" by triangulating the distance from a π-point to the closure of the interval [0,1]. This representation has a natural (fully faithful) 1-categorical "realization" via the shape modality[23]: $\int Pol(\pm\pi)$, which is given by the triangulation between π-points and $\partial\mathscr{U}_N$.

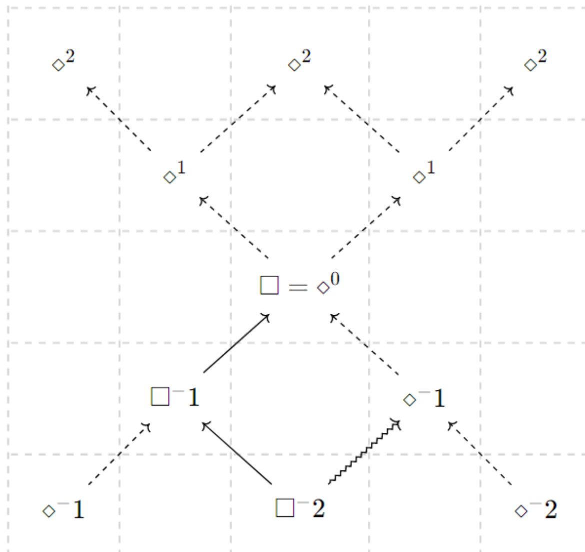
§**Hop5** Take the set of $\Box\pi$-points, assigned the truth value one, and define an *exit path* $\Box \to \Diamond$ as the *implicit* (class-level) *shape* connecting it to an element on the lattice whose truth value is <1.

Morally, this is a *shift in polarity* whereby the *boundary* of the *preferred neighborhood* is **transcended**; such a transition has as its epitome the transference between the counting numbers and the *real numbers*.

This sort of escape, or exit, from one preferred set of numbers into the surrounding sea of "weird" numbers is more or less what I mean when I speak of lifting in "Successiveness and Operadicity."

In this case, we are moving from stationary, *strictly necessary* truth values to a complimentary comb of probabilities which it is defined in relation to.

[23] See: shape modality in nLab (ncatlab.org); it is used in "Cohesive homotopy theory"



§**Hop6** In *real*, *actual* physical space (read: 3-dimensional) space, we multiply each diamond and square by a representation,

$$\mathrm{rep}(\pi)=\Diamond\vee\square(\int\pi),$$

where the right-hand-side is negative for possible moments and positive for the necessary ones.

A moment which has q=2 is called "*possibly possible*;" we say of the space in this region that its difference from the singularity is a qth order differential, and thus we say that it "will be possible." Because of the lack of singular determination, these modes of entropy are *purely probabilistic*, and therefore are quantum, whereas the 3-scalar at the center of the cone is classical, and fully determined by the actual worldline of squares.

A zigzagged arrow represents a moment in time that *was possible*, but was never *actualized*, and therefore never received a geometric representation, and hence a shape in the n-space of the singularity, and so was *never really possible*.

Formally, if a diamond transitions from a q=1 state to a q=-1 state, its possibility is effectively canceled by the inertial action of the Stone-Čech compactified n-space. Another way of putting this is that there was no *escape path* from the q=-1 *necessary moment* to the *quantization window* of the spectral $\Diamond^{-1}$-topos. See §**Ĝan9** for a refresher on windows.

Here, by the conjugation of a $\pi(*)^q$ element, with * representing either a deterministic or a probabilistic (read: possible or necessary) mode of entropy, we mean a morphism

$$A=\pi(*)^{q} \rightarrow \overline{A}=\pi(*)^{|q|}$$

from q to its absolute value.

Because all of the *momenta* of the real 3-space lies within the realizations of necessary elements, its momentum is conserved across their realizations, and thus, the representations of these elements are *physically*, *actually*, ***literally*** real, and they are equal to their conjugates.

Thus,

$$\Box A=\overline{A}$$

whereas

$$\Diamond A \neq \overline{A}\Diamond$$

Hence, we have an *arrow of time* moving between the negative and the positive q-values of necessary moments.

§**Hop7** Because there are no *future* necessary states,

$$\max(q):(\int\Box^{q}\pi)=0$$

Hence, all of the vectors in the *present mode* of entropy satisfy the Jacobi identity:

$$[p_0,[p_1,p_2]]+[p_1[p_2,p_3]]+[p_3[p_1,p_2]]=\pi^{0}0^{p}$$

Additionally, the transition

$$\int\Box^{1}\pi \rightarrow \Box^{-1}\pi$$

is impossible.

Because, as in §**Hop3**, $t(\int\Box\pi)$ is equal to $\frac{1}{b}\in[0,1]$ and is maximal as **T**, it is impossible to establish a "chirality" for this number; one cannot tell precisely whether $\frac{1}{b}$ enters the interval from the right of f_{Gau}, or from the left. This is especially so at the singularity if one lets q=b; thus, we have $\frac{1}{0}\in[0,1]$.

Suppose that b is a type, and call it the b-gauge, as was done in [bgau]. Roughly,

$$\forall x: b;\ \exists x'^{n}: *\ b\ *$$

where

$$*b* \rightarrow \sum x \neq \widehat{b},$$

such that for $q \neq 0$, the n-space of the neighborhood of momenta $q(\pi)$ lies outside the curl of the potential gradient encompassed by the b-gauge.

Say that the lattice formed by rays co-incident with and tangent to $\hat{b}$ form the quantization window, $\tilde{q}$. Write

$$\alpha_{Pol}\tilde{q}$$

for the *sign* of a complex number α in $\mathbb{L}^4$, the Minkowski lightcone with positive time dimension. Say that it is spin up $(\alpha\uparrow)=\overline{\alpha}$ if it is *above* $\hat{b}$ and spin down $(\alpha\downarrow)=-\overline{\alpha}$ if it is below. If it is *neither above nor below* $\hat{b}$, it is b-Cauchy, and is present.

Say that a *spin down* number (possibly) *existed*, and refer to its stratum as the *past* of the lightcone; put:

$$(\sim\exists\alpha\downarrow n)\in\downarrow\mathbb{L}^{(n-k)/2}$$

Say that a *spin up* number (will possibly) *exist*, and refer to its stratum as the *future* of the lightcone; put:

$$(\sim\exists\alpha\uparrow n\in\mathbb{L}^{(n-k)/2})$$

Where

$$((\sim\exists\alpha\uparrow n\in\mathbb{L}^{(n-k)/2})\neq(\sim\exists\alpha\downarrow n)\in\downarrow\mathbb{L}^{(n-k)/2}))\notin b,$$

and where the tilde is used to denote superposition between □ and ◇. Clearly, if a space is square, then it must exist within the past of $\mathbb{L}^4$. Therefore, in such a case, there is an equivalence between

$$\sim\exists\alpha\downarrow n$$

and

$$\exists\alpha\downarrow$$

However, no such equivalence exists between

$$\sim\exists\alpha\uparrow n$$

and

$$\alpha\uparrow$$

so that necessity is a strict conditional dependency of the quality "is at or below $\hat{b}$."

§**Hop8** The categorical 4-space of necessary possibilities then condenses to a *1-dimensional* **ray** from $\hat{b}$ to min(q):(□^{q}); this ray forms a compass category whose universal property is that every morphism

$$\mathfrak{z}:\ \alpha\downarrow\ \rightarrow\ \hat{b}$$

factors through a reflection of $\hat{b} \cup \Sigma(\sim\exists\alpha\downarrow n^{n})$, where $\Sigma(\sim\exists\alpha\downarrow n^{n})$ is the Polyakov effective action[24]:

$$\left(\frac{1}{2}\int_{\alpha} \widehat{\alpha'}^{2}\, d(\hat{b}, \alpha')\right)^{2}$$

while the corresponding universal property for the opposite compassionate ray is that every morphism

$$\mathfrak{z}' : \alpha\uparrow \to \hat{b}$$

factors through a reflection of $\hat{b} \cup \Sigma(\sim\exists\alpha\uparrow n^{n})$, with Polyakov action

$$\left(\frac{1}{2}\int_{\alpha} \hat{\hat{b}}^{2}\, d(\alpha', \hat{b})\right)^{\frac{1}{2}}$$

where

$$\alpha'^{\frac{1}{2}}$$

has 2^{n}-morphisms into the modulus center of b,

$$b/\hat{b}\backslash(\partial b/b_{b})$$

$$=$$

$$\left(\int b\right)^{❤}$$

$$=$$

$$\left(\Pi\backslash\mathbb{L}^{2+2}\right)^{❤}$$

$$=$$

$$\widehat{b^{\sharp}}$$

$$=$$

$$\hat{b}^{\flat}$$

and the reflection

$$\Sigma b \to b'$$

is coextensive with the heart of the b-gauge. The co-reflection:

$$\Sigma b' \to b$$

is anti-chiral; and thus, not neutral. Thus,

$$\boldsymbol{\lambda} \lesseqgtr [0,1]$$

is anti-symmetric with the $\boldsymbol{\delta}$-small object $b \in [0,1]$.

This is the arrow of time. Hence, the inner product of b with itself k many times;

$$b \odot_{k} b$$

---

24 [Pol]

has a gradient vector transverse to the 2-momentum of the *anisotropic* (read: *crystalline)* action of the transverse Ricci motion of time and potential, which we identify here as:

$$\mathcal{Time}: \lim_{q \to 0} xyz(\alpha \downarrow)$$
$$\mathcal{Potenial}: \lim_{q \to \infty} xyz(\alpha \uparrow)$$

Q.E.D

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※8
Energy numbers and the capital B-gauge

☪ I Corinthians 11:11-12

§**Cau1** In [Cau, pg.7], it was written:

"That the effective Lagrangian is Lorentz-invariance ensures that Lorentz transforms of solutions to the field equations are again solutions to the field equations. It does not, however, ensure that all inertial frames are on an even footing."

This implies ever-so-obviously that, in this work, there is a *privileged frame of reference* (PFor),

$$\mathcal{Priv}_1(\mathfrak{F})^{\flat} = \mathfrak{F}$$

for the harmonic propagation of spatial anisotropy is given actualization; viz.:

$$\mathfrak{F} \supset \mathfrak{F}^{\flat}-\Delta(f_j),$$

where f_j is a complacent 1-form and $\Delta(x)$ is the *Lorentz boost* of the 1-dimensional (*directed*) oscillatory mode. The authors attributed this phenomenon to the failure of superluminal mechanics to be naturally imposed upon the Goldstone model.

The frame is uniquely quasi-static, in that there is an irreconcilable *obstruction* to the initialization of a singular value which minimizes the Cauchy entropy of the system by preventing evolution of time-slices.

As constructed, the theory maintains that superluminal communication *violates* Hamiltonian flow in the Goldstone model by imposing a sort of sacrilegious value $c_i<3$, thus causing the decoherence of causality.

Generously, if $\mathbf{Ham}_k$ is a stack, then we have a descent

$$\mathbf{Ham}_{\mathbf{coh}} \to \urcorner\mathbf{Ham}$$

where the anomalous result is caused by taking the Lorentz boost and factoring it through a sheaf $\{\mathbf{L}_i\}_{i\in 2}$ so that the small topos of *regular*, *isotropic* light-matter propagation becomes locally tiny in the space of anyonic interaction.

Recall the equation (14, ibid):

$$G_{\mu\nu} = \eta_{\mu\nu} - \frac{4c_3}{\Lambda^4}\partial_\mu\pi\partial_\nu\pi + \ldots ,$$

Where, as the authors put it: "the dots stand for terms which may be neglected when $\partial_\mu\pi\partial^\mu\pi/\Lambda^4 \ll 1$."

§**Cau2** Now, using the logic of **※5,df.7**, we can *reinterpret* the symbol $\ll$ to mean "well inside," and we can rewrite 1 as the Planck constant. Doing this gives us:

$$\pi^2\partial\bar{\partial}/\Lambda^4 \Subset \hbar$$

Using the quasi-b gauge, as we did in ※7, we can define the symbol ⋐ as follows;

if a ⋐ b,

then

$$(a^{\aleph} \downarrow \subset b^{2\aleph} \downarrow) \vee (a^{\aleph} \uparrow \subset b^{2\aleph} \uparrow) \in \mathbb{L}^{4}_{Minkowski}$$

such that the nonwandering points {a,b}<ℵ/ℵ^2 are ramified by a neighborhood $\mathscr{U}(\hat{b} \approx \mathbf{T})$ in which the Lagrangian of a∈b diverges through a single fixed point, $\hat{b}$, which acts as an ultrafilter[25] on the formal power series of $\mathbf{\Psi}<a_i, b_i, ..., \omega_i>$.

§**Cau3** Write

$$\mathcal{P}riv_{\mathbf{\Psi}<ai,bi,\dots,\omega i>} \rightarrow \mathfrak{F}_{\mathrm{Pyk}}$$

for the curl of the forwards momentum of a traveling body emitting thermal radiation inside of $\mathbb{L}^{4^{k}\sim\omega}$. With respect to the flat Cauchy slice $\mathcal{C}au^{\flat}$, say that

$$\partial\bar{\partial}Y_3$$

has a tempered hypercharge flux field [Fth] if

$$\mathbb{F}_k \doteq U(1)_Y$$

such that the harmonic sequence

$$\tfrac{1}{2}\, k + \tfrac{1}{3}\, k' + \tfrac{1}{4}\, k'' + \dots + \varepsilon k_{\boldsymbol{\omega}}$$

is Schwartz.

This gives us a background in which the stack

$$\mathbf{Ham}_{\mathrm{SUPER}}$$

takes as its principle fiber domain the compactified U(1) worldline bundle with SO(2) spin spheres in the UV periphery. Two cases arises here:

Isotropic	$\sum_{0}^{1} \hat{q}\alpha(\uparrow,\downarrow) \rightarrow Y(q,\hat{b})$
Anisotropic	$\sum_{0}^{1} \hat{q}\alpha(\uparrow,\downarrow) \rightarrow Y^{\sharp}(q,\hat{b})$

In the first case, there is a local correspondence of the SO(2) spin condensate to the resting energy of the quasi-b gauge which results in a Yukawa coupling of the chiral particle (and its flat forward momentum) with the neighborhood of singularity:

$$(\mathcal{U}(\tfrac{1}{k\sim 2}(\mathbb{L}^4)))^{❤}$$

[25] Not necessarily principle

In the anisotropic case, the forward momentum of the particle is *polygamously entangled with* the F/k flux field, such that the 4-coordinates of its k-nearest neighborhoods form a degenerate mixed state. This may be written as:

$$\mathbb{F}/k(\alpha_{xyz}+t):\ \int \mathbf{Ham} \rightarrow \iint \mathbf{Ham}_{super}$$

This shows a reasonable agreement with Emmerson's concept of the "energy numbers" [En1 and En2]. Roughly speaking, an *energy number* is a quantum number which takes a value v in the sheaf

$$\{Q_v\}_{v \ll V^4} = \mathcal{E}\boldsymbol{mm}.$$

and assigns to it a *hypercharge direction* ($Y\nearrow, Y\swarrow$) so that the Abelian poles of the gradient over a minimal representation of the particle α with velocity v'<v are not conserved. This gives the V-sheet representing $\mathcal{E}\boldsymbol{mm}$. a non-conserved lepton number as well, by preventing the charge directions in the rigid space from faithfully mapping on to any affine variety with privilege 1 in the classical regime. Importantly, energy numbers describe *open strings* which are representations of non-transitive inner models of the Hopf monad.

This allows us to bypass several of the restrictions imposed by the complex numbers by introducing an anomaly cancellation at the level of v-rational sets. This works by, in the spirit of Lemay and Hasegawa [Sta, 5.11], taking the character

$$\chi_{\perp} \sim t_{\Sigma}(v'(\alpha))$$

and sending it to the Mori specialization functor

$$\mathcal{MOR}:\ \chi_{\perp} \rightarrow \chi_{\top} \sim \mathrm{spec}(\textstyle\sum_{Reflec}(v:\alpha^{\infty}))$$

so that the continuously ultraviolet spectrum generated by $\chi_{\perp}$ converges (but not absolutely) to a value outside of the co-domain of the measurable Ricci flat subspaces of $\mathbb{L}^4$.

§**Cau4** Canonically speaking, this mechanism works by dropping the relative perversity of the Emmerson sheaf and "pulling back" into a pre-animated stack of Hodge modules which map one-to-one in the projection of the function:

$$f(\widehat{b}) \mapsto \widetilde{\widehat{B}}_{e\vee i}$$

which closely resembles the Yukawa coupling of the $\widehat{b}$-gauge, but at a much larger scale of the universe[26].

The k-volume of the B-gauge's universe is higher than the Minkowski universe, because k>4, but the *density* of the universe is much higher because its genus is increased by the abundance of exciton-polariton holes in the bulk region.

---

[26] Say, perhaps, that it is a *meta-coupling*, with respect to which the standard coupling becomes *pseudo*

Because of this abundance, the semiclassical effective action becomes quantized at the entangled clouds surrounding endpoints of the opened strings. Whereas in the small b-gauge there was a blackbody 0-spectrum which lensed the excitation of higher dimensional particles and thus caused them to appear in superposition, they appear as spatially distant in the B gauge due to the decoupling of the spatial dimensions from Cuachy time slices. At or near the boundary, the reflective comb of the critical line polarizing the gauges causes the distortion of the flat energy fields, which causes them to appear as ring-like manifestations and increases the energy number of their Hilbert sphere embedding.

As a result, quantum particles that appear to be *monogamously entangled* in the B-gauge have decreased communication latency when interacting with classical particles, causing the signal to be transmitted with an acausal or superluminal mode. This perturbs the Markov blanket of B-gauge particle pairs as they approach the semiclassical limit, and forces them to be polygamously entangled, and thus causes their pure states to have an infratemporal lifespan, and thus causes the instantaneous collapsing of the wavefunction.

§**Cau5** Write (α,β)⇜$(p_x:(D))$ for a pair of gauginos in the B-gauge which are path-connected by an open string p_x. Say that each of (α,β) is ***topologically simple*** if they consist in a 3-dimensional planar slice parameterizing a convex neighborhood of infranilmanifolds.

Here, D encodes the hypercharge direction,

$$Y_\eta \in \{\mathrm{Pow}(H\nearrow, H\swarrow)\}$$

which decomposes into a 4-by-4 matrix consisting of 2-dimensional spin compositions:

$\pi\uparrow\downarrow = \mathbf{1}_\pi$	$\pi\downarrow\downarrow = 1_{\pi^2}$	$\pi\leftarrow\downarrow = 1_{-\sqrt{2}\pi}$	$\pi\rightarrow\downarrow = 1_{\sqrt{2}\pi}$
$\pi\uparrow\uparrow = 1_{\pi^2}$	$\pi\downarrow\uparrow = \mathbf{1}_\pi$	$\pi\leftarrow\uparrow = \mathbf{1}_{-2\pi}$	$\pi\rightarrow\uparrow = \mathbf{1}_{2\pi}$
$\pi\uparrow\rightarrow = \mathbf{1}_{2\pi}$	$\pi\downarrow\rightarrow = 1_{\sqrt{2}\pi}$	$\pi\leftarrow\rightarrow = \mathbf{1}_\pi$	$\pi\rightarrow\rightarrow = 1_{\pi^2}$
$\pi\uparrow\leftarrow = \mathbf{1}_{-2\pi}$	$\pi\downarrow\leftarrow = 1_{-\sqrt{2}\pi}$	$\pi\leftarrow\leftarrow = 1_{\pi^2}$	$\pi\rightarrow\leftarrow = \mathbf{1}_\pi$

Where by $\mathbf{1}_\pi$ we mean there is zero charge acting upon an instanton π on the worldbrane of a 2-sheeted flux field f_f, and by 1_{π^2} we mean there is a classical (Riemannian; Minkowski) force acting upon π.

The energy numbers $\mathbb{E}$ assign to all other values a real number in the interval $(-\infty,+\infty)$ corresponding to the determinant of a matrix assigning pseudo-random probabilities of π being quantized at a position on its path integral. This may be written as

$$\det(\mathbf{B}) \rightarrow (\exp(\hat{b}_i)) \in \mathbb{R} \backslash \{\infty\}$$

where the left hand-side is a chiral fermion and the right-hand side is a boson; specifically, it is a *gaugino*, and in this case, *gaugino condensation* occurs as the potential of the gaugino escapes from the B-brane and is measured as a vacuum fluctuation in the $\mathbb{L}^4$ lightcone gauge.

Since, on the **B**-brane, there is no *globally available* lightcone, we have that equations of the form

$$\frac{1}{2} \int_{Minkowski} \alpha \uparrow, \beta \downarrow$$

correspond to no *animated* light-like polarization, and thus instead we get a timelike equation:

$$T_0$$
$$=$$
$$\frac{1}{x} \int_B < \alpha | 1_{k\theta\pi^m} | \beta >$$
$$=$$
$$\Psi_{\tau_n} \alpha + \sqrt{\beta}$$
$$=$$
$$\Psi_{\tau_n} \sqrt{\alpha} - \beta$$

which describes the transition amplitude of a timelike boson entering the configuration space of a thermal, *locally discrete* but *globally continuous* particle cloud.

What this means is that when some object living in, say 8 dimensions, is "Higgsed," it acts upon the Shannon entropy of a measurable body by *warping* the Einstein product manifold low-energy relativistic regime. Dually, the mechanism by which objects gain their forward momentum acts by *reflecting* the entangled 2-qubit systems of the B-regime along tensile boundaries of the local energy wells and distributing them across light-wise diffracted and time-wise contracted packets of energy.

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Ŝnuras Hundo

♪ Erik **Satie - <u>Gnossienne No. 1</u>**

§**Hun1** In my discussions with O. Hancock (EndlessKettle), we spoke of something called a "pure space", and decided on the notation

$$\mathbf{BraSpc} \sim \mathbf{Graphs}_{\mathbf{PURE}} \sim \mathbf{PURE}^{\#};$$

well, actually, we did not decide on this up-front; we both agreed on something like "BraSpc" for the category of pure spaces, owing to its resemblance to Wolfram's "branchial space." However, it is in my view that there ought to be a category simply called **PURE**, which, on its own, is unmarred by the details of any other.

At first, I struggled to think of what the objects and morphisms of such a category ought to be. Then, after loosening my mind about what constitutes a category in the first place, I became a bit more relaxed. I now believe that **the objects** of **PURE** should be ***pure elements,*** something quite like a "urelement," and that the **morphisms of PURE** should be something like "vacuum fluxes."

As to what the relationship between **PURE** and other categories ought to be, I still am indecisive. I would like to say that there is a set of sheaves

$$\{\mathbf{PURE}_c\}_{c \in \mathbb{E}}$$

$$\{\mathbf{PURE}_\lambda\}_{\lambda \in \mathbf{\Lambda}}$$

and

$$\{\mathbf{PURE}_\omega\}_{\omega \in \mathbf{\Omega}}$$

with representatives in, respectively, the stack of energy numbers (**StErNum**), the graphs of causal sets (**GCausSets**), and the class of uncountable cardinals (**UncC**).

Formally, **UncC** *parameterizes* the "phase space" (informally speaking) of a compass $\mathfrak{C}_\Omega$, which has as its charts the *movable* spaces $\mathbb{C}Pol_{\boldsymbol{\pi}}^{\mathbb{Q}}$ and $\mathbb{O}Pol_{\mathbb{e}}^{\mathbb{H}}$, where $\boldsymbol{\pi}$ is transcendental over $\mathbb{Q}$ and the energy number $\mathbb{e}$ is transcendental over the quaternions.

§**Hun2** With **UncC** now described, it gives us some pleasure (hopefully), and some optimism that we may also quilt together some fashionable item using also **GCausSets** and **StErNum**.

Actually, we have already seen that **StEnNum** appears in **UncC** as a *movable* projective space which transcends the quaternions; thus we may write

$$\mathbf{StErNum} \sim \lim_{n \to \mathbb{e}} \mathfrak{C}_\Omega$$

and we have effectively illustrated a congruence between the ∞-groupoid of rings in the geometric domain and the stack:

$$\textbf{StErNum} \rightarrow \Lambda^{q}_{p-1} \rightarrow \int \Delta_{\mathrm{Nec}}$$

of cyclotomic traces with validations in the simplicial sets of **Nec.**

We may like to unpack, or as Emmerson says, "deprogram" Λ further. Specifically, we want to show that

$$\lim_{\lambda \rightarrow |\infty|} \textbf{StGraphs}$$

gives us some effective structure Λ which is compatible with the compass of **UncC**. Thus, it would be desirable to show that **GCausSets** decomposes in a *similar fashion* to $\mathfrak{C}_{\Omega}$.

Write:

$$\mathbf{\Omega}_{\nabla} \sim \Lambda^{q+1}_{p}$$

to show some semblance of a correspondence between the notions of the "universal" (in the $\mathfrak{U}^{+}$(octonion) sense) compass, and the graph of causal sets arising from the sum total:

$$\sum_{i \ll PURE}^{max(PURE)^{\sharp}} BraSpc(\alpha_i)$$

§**Hun2** Fix a universe $\mathfrak{U}^{++}=\mathfrak{U}^{+}(\mathfrak{U}^{+}(\mathrm{Nec}))$, or perhaps write $\mathfrak{U}_{\mathrm{SUPER}}(*)$. This will be our "*magnum opus*" (for now). Just as the *preeminent* "anima" of **UncC** and **GCausSets** were unified in **PURE**, in that they existed in primacy, in a very latent form, yet to receive any sort of non-trivial scheme, they are also unified *here* as well, but in the **Ω**-sense; they are final, and complete, fully evolved. Thus,

$$\textbf{Proj}(\textbf{Proj}(\textbf{Proj}(\ldots(\textbf{Proj}(x)))))$$

transforms to

$$\mathfrak{U}^{++}(x \ll X)$$

as the directed vacuum fluctuations continue to pass through an increasing succession of quasi-filters towards their final destination.

Denoting this chain as such:

$$\mathcal{O}_{\mathrm{PURE}} \ll \textbf{PURE} \ll \mathcal{O}_{\mathrm{PURE}}$$

gives us that

$$\mathrm{Dim}(\mathcal{O}_{\mathrm{PURE}}) < \mathrm{Dim}(\textbf{PURE}) < \mathcal{O}_{\mathrm{PURE}},$$

a contradiction.

Yet, one (or at least I) cannot help but find some resolution here. Namely, we can think of some pair of objects {a,b} in **PURE** with *no morphism between them* as bounding a sort of discrete portion of the vacuum space, and think of the term on the left-hand side as having some "dark energy," i.e., being embedded into the negative dimensions at the cross sections of the objects, and the right hand term as being typical of the matter we *actually observe* here in the known universe.

I want to call, as in **※0Rm.1.1**, a monad [$\mathbf{\Psi}$, φ, η] consisting of a twofold map: $\mathbf{\Psi}_{ij}:\varphi\rightleftharpoons\eta$, an ***atom***, and in the technical sense I have espoused, I think it seems fitting. An **atom** of **pure space** consists of a baryonic flux tube, $\mathbf{\Psi}$, and two elements φ and η with which it interacts. Now, there are a few difficulties in reconciling this view with the standard model. Firstly, we can think of $\mathbf{\Psi}$ as either a gluon (or gluino), and the others as quarks; or, we can think of *all three* elements of the monad as quarks.

In the latter case, we adopt a sort of quark-diquark model of particle physics, where $\{\varphi\rightleftharpoons\eta\}$ is a single diquark, and $\mathbf{\Psi}$ is a lone quark. Here, the atom condenses down to a sort of doublet,

$$\{\mathbf{\Psi}\&\mathbf{\Phi}_{\eta}\},$$

where the subscript denotes that the urelement η has been subsumed by φ; i.e., the identity of φ is "promoted" to the label of the diquark, and η is a connected component of the path $p(\varphi\rightarrow\eta)=\mathbf{\Phi}_{\eta}$.

This is a somewhat nicer view of the atomic monad.

I have not much more to say on this matter.

※10

Serenity

"Blaise Pascal once remarked 'All misfortune comes from the fact that people can't stay peacefully in their own room.'"
-Hasso Spode, ***Time Space and Tourism***

§Ser1 Having faith in that power which is incorporeal; that power which all men have as their superpower; I know only that I may live pleasantly in any capacity.
§Ser2 For if it hadn't been the case that I had at my disposal the ability to see the *mauve*; the colorful; the beautiful; the spectral, then I'd have resigned my grotesque form sooner rather than later.