

May 2019 Notes

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20190523 Prayer

Gratias tibi

Da mihi auxilium

Da mihi auxilia

Nolite iudicare ut non iudicemini

Ignorantia iuris non excusat

Res negligentiae ipsa loquitur

Res diligentiae ipsa loquitur

Potuissemus

Poterimus

In Nomina Patris

Amen

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20190422-20190423 Apex of Theoretical Mathematics Career

Linear Algebra

Spectral Theorem / Diagonalization

Goal: Diagonalize operators: $T \in \mathcal{L}(V)$, find eigenbasis $B = (e_1, \dots, e_n)$ such that

$$M(T, B, B) = \begin{bmatrix} \lambda_1 & \dots & 0 \\ \dots & \dots & \dots \\ 0 & \dots & \lambda_n \end{bmatrix}$$

Find diagonal matrix for any basis.

Fundamental Theorem of Algebra: Every complex polynomial has at least one solution.

Find zeros of polynomial (with λ) to find eigenvalues.

Def: Adjoint: $T \in \mathcal{L}(V)$, $\langle T(v), u \rangle = \langle v, T^\dagger(u) \rangle$.

Ex: $T \in \mathcal{L}(\mathbb{C}^n)$, $T(v) = Av$, then $T^\dagger(u) = A^\dagger u$.
 $\langle T(v), u \rangle = \langle Av, u \rangle = u^\dagger(Av) = [u^\dagger(A^\dagger)^\dagger v] = (A^\dagger u)^\dagger v = \langle v, A^\dagger u \rangle = \langle v, T^\dagger(u) \rangle$.

Properties of Adoints

$S, T \in \mathcal{L}(V)$, $a \in \mathbb{C}$.

$$(S + T)^\dagger = S^\dagger + T^\dagger$$

$$(cT)^\dagger = \bar{c}T^\dagger$$

$$(T^\dagger)^\dagger = T$$

$$(TS)^\dagger = T^\dagger S^\dagger$$

$$(Iv)^\dagger = Iv$$

$$M(T)^\dagger = M(T^\dagger)$$

Partial Differentials

\exists mixed category PDE

Constant-Coefficient equations have solutions

$$e^{\sigma t + ikx} \rightarrow \sigma(k) \rightarrow \begin{cases} \operatorname{Re}\sigma(k) < 0 \implies \text{stable} \\ \operatorname{Re}\sigma(k) > 0 \implies \text{unstable} \end{cases}$$

$$e^{ikx - i\omega t} \rightarrow \omega(k) \rightarrow \begin{cases} \text{Phase Velocity} = \frac{\omega}{k} \\ \text{Group Velocity} = \omega'(k) \end{cases}$$

Dispersion: $\frac{\omega}{k} \neq \text{constant}$. $\omega'(k) \neq \frac{\omega}{k}$.

Telegraph

$$u_{tt} + (\alpha + \beta)u_t + \alpha\beta u = c^2 u_{xx}$$

$$u = e^{\sigma t + ikx}, \sigma^2(\alpha + \beta)\sigma + (\alpha\beta - c^2 k^2) = 0$$

$$\sigma = \frac{1}{2}(-(\alpha + \beta) \pm \sqrt{(\alpha - \beta)^2 - 4c^2 k^2}) \implies \text{Re}(\sigma) < 0.$$

$$\sigma = -\gamma(k) \pm i\omega(k), \gamma = \frac{\alpha + \beta}{2}, \omega = \sqrt{c^2 k^2 - \frac{(\alpha - \beta)^2}{2}}$$

$$\text{Compute group velocity} = \omega'(k) = \frac{c^2 k}{\sqrt{c^2 k^2 - \frac{(\alpha - \beta)^2}{2}}}$$

If $\alpha = \beta$, $\frac{\omega}{k} = \omega'(k) = \pm c$

Due to entropy of signal. This describes the signals traveling through a cable (1 meter thick) stretched across the Atlantic Ocean.

Greatest Question of My Math Career

Not to cast dispersions from this lecture - it is my current understanding that one differentiating factor between categories of PDE is that not all points of hyperbolic equations are immediately impacted by a perturbation?

Answer by Dr. Glasner: It is most useful to think of propagation speed

General Reflection

Real Analysis

Cardinality of Arbitrariness

Properties of ordinals

Uniquely identify null sets

Axiom of Choice \implies Well-Ordered Set

Archimedean Principle \implies Peano's Postulates \implies induction.

Math crumbles if the following properties do not hold:

$$\lim(S \pm T) = \lim S \pm \lim T$$

$$\lim(S \cdot T) = \lim S \cdot \lim T$$

Continuity: $\lim_{x \rightarrow x_0} f(x) = f(x_0)$ means $\forall \epsilon > 0, \exists \delta > 0$ s.t. $\forall x \in D_f, |x - x_0| < \delta \implies |f(x) - f(x_0)| < \epsilon$.

Metric Space

Probability

Probability is preserved in French

Finance

\$5 Million US Bond, 3% Risk-Free Rate, returns \$100,000 per year in interest and I get the \$5 Million back at the end

12% is rock-star status

Takes \$50 Million to make \$5 Million

Indirect Costs → Indirect Costs... Quick Contract Closeout Process

Negotiable Instruments (Checks)

Allocation Basis

Time Value of Money

Growth (Interest) → Hyperbolic $u_{tt} = c^2 u_{xx}$

Decay (Inflation/Depreciation) → Parabolic $u_t = D u_{xx}$ → Random Walk \implies Diffusion

Annuity (Taxes) → Elliptical $u_{xx} + u_{yy} = 0$

On Growth and Form (Book)

Stochastic Processes

Discrete Time Markov Chain

State Space \iff Stationary Distribution

0.0.1 Transient ($\rho < 1$) / Recurrent States ($\rho = 1$) } Class Properties

where $\rho_{xy} = P_x(T_y < \infty)$ and $T_y = \min\{n \geq 1 | X_n = y\}$

x lead to y

x is recurrent

\implies

y is recurrent

0.0.2 Stationary Distribution

$$\pi(y) = \sum_x \pi_0(x) P(x, y), \forall y$$

Null Recurrent $\implies m_x = E_x(T_x) = \infty$ (Time Expected to Wait).
 Positive Recurrent $\implies m_x = E_x(T_x) < \infty \implies$ unique stationary distribution.

$$\pi(x) = \frac{1}{m_x}$$

Periodicity: 0,1,0,1,0,1,...

Aperiodicity: $\lim_{n \rightarrow \infty} P^n(x, y) = \pi(y)$

Markov Property

$$P(X_{n+1} = x_{n+1} | X_n = x_n, X_{n-1} = x_{n-1}, \dots) = P(X_{n+1} = x_{n+1} | X_n = x_n).$$

For Continuous Time Markov Chains, embed into discrete skeleton.

0.1 Random Walk

Note: Used to generate diffusion equation

$$P(x, y) = \begin{cases} f(y - x) \\ p, y = x + 1 \\ q, y = x - 1 \\ r, y = x \\ 0, elsewhere \end{cases}$$

0.2 Ehrenfest Chain

d balls, 2 boxes

Randomly chosen put into other box

$$P(x, y) = \begin{cases} \frac{x}{d}, y = x + 1 \\ 1 - \frac{x}{d}, y = x - 1 \\ 0, elsewhere \end{cases}$$

0.3 Gambler's Ruin Chain

$\psi = \{0, 1, 2, 3, 4, \dots\}$

$$P(x, y) = \begin{cases} p, y = x + 1 \\ q, y = x - 1 \\ 0, elsewhere \end{cases}$$

0.4 Birth and Death Chain

$$P(x, y) = \begin{cases} p_x, y = x + 1 \\ q_x, y = x - 1 \\ r_x, y = x \\ 0, \text{elsewhere} \end{cases}$$

0.5 Queuing Chain

X_0 denotes the number of customers present initially

X_n denotes the number of customers present at end of n th period

$$X_n = 0, X_{n+1} = \zeta_{n+1} \text{ if } X_n \geq 1, \text{ then } X_{n+1} = X_n + \zeta_{n+1} - 1$$

$$P(0, y) = f(y), P(x, y) = f(y - x + 1), x \geq 1$$

0.6 Branching Chain

X_n is the number of particles alive at each generation

0.7 Gene Division

Gene has d units and m mutants

X_n is the number of mutants

$$P(x, y) = \frac{\binom{2x}{y} \binom{2d-2x}{d-y}}{\binom{2d}{d}}$$

Port of Entry Modeling

Diffusion of: migrants, products, services, skills, intellectual property, CDC stuff, BML stuff

Parabolic: $u_y = Du_{xx}$

Separation of Variables:

$$\frac{T'}{T} = \frac{X''}{X} = -\lambda$$

Ansatz: $T(t) = Ae^{-\lambda t}$

Ansatz: $X(x) = B\sin(\sqrt{\lambda}x) + C\cos(\sqrt{\lambda}x)$

Depends on boundary conditions

Dirichlet

$$u(x) = f(x), \forall x \in \partial\Omega$$

Neumann

$$\nabla u(x) \cdot \hat{n}(x) = f(x), \forall x \in \partial\Omega$$

$\nabla u(x) = \text{Gradient}$

$$\hat{n}(x) = \frac{T'(x)}{\|T'(x)\|}$$

Operations to Determine unit Normal Vector

Tangent Vector:

$$\vec{r}(t) = \langle t, 3\sin t, 3\cos t \rangle$$

$$\vec{r}'(t) = \langle 1, 3\cos t, -3\sin t \rangle$$

$$\|\vec{r}'(t)\| = \sqrt{1 + 9\cos^2 t + 9\sin^2 t} = \sqrt{10}$$

Unit Normal Vector:

$$\vec{T}(t) = \frac{\vec{r}'(t)}{\|\vec{r}'(t)\|} = \frac{1}{\sqrt{10}} \langle 1, 3\cos t, -3\sin t \rangle$$

$$\vec{T}'(t) = \frac{1}{\sqrt{10}} \langle 0, -3\sin t, -3\cos t \rangle$$

$$\|\vec{T}'(t)\| = \frac{3}{\sqrt{10}}$$

$$\vec{N}(t) = \frac{\vec{T}'(t)}{\|\vec{T}'(t)\|} = \frac{\sqrt{10}}{3} \frac{1}{\sqrt{10}} \langle 0, -3\sin t, -3\cos t \rangle = \langle 0, -\sin t, -\cos t \rangle$$

Binormal (Orthogonal):

$$\vec{B}(t) = \vec{T}(t) \times \vec{N}(t)$$

Flux is the binormal

General Formula:

$$\phi_F = \int \int_A F \cdot dA = \int \int_A F \cdot n dA$$

A wall is 3 dimensional. People occupy 3D space. But, we should limit the boundary to 2 dimensions (eagle's view). So, the diffusion equation becomes: $u_t = \alpha \Delta u = \alpha(u_{xx} + u_{yy})$.

Random Walk in 1 dimension lead to Diffusion Equations and Gaussian Distribution.

Note: Currently disregarding the wave wave equation. Diffusion under parabolic PDE category. Waves are hyperbolic, finite propagation speed, travel along characteristics (like roads and supply chains), shocks, rarefactions. Best for time dependent phenomenon, heat conduction, and particle diffusion.

0.8 Parabolic Equations

$$Au_{xx} + 2Bu_{xy} + Cu_{yy} + Du_x + Eu_y + F = 0, \text{ if } B^2 - AC = 0.$$

Note: Known for pricing derivative in investment:

- instruments
- reserving: aggregate liability
- ratemaking
- predictive modeling

Perturbance felt at all points

Quote from wiki to get a sense: "Temperature rises and falls at a rate proportional to the difference between the temperature at that point and the average temperature near that point. u_{xx} measures how far off the temperature is from satisfying the mean value property of harmonic functions (Laplace)".

Harmonic Functions

- Regularity Theorem
infinitely differentiable

- Maximum Principle
Reaches max at boundaries

- Mean Value Property
average on surface of sphere is equal to average in the center of sphere

It makes most sense to use a model of (infinite propagation speed) parabolic PDE states; because, at a Port of Entry, the immediate, adjacent properties, are immediately felt. Now we must move into the stochastic processes of the parabolic states.

See Stochastic Processes Above for Types of Chains

It seems the most pertinent chains are: Gambler’s Ruin, Birth and Death, Queuing, Branching, Generations of Mutants.

What are the product and lifecycle models we should look at in regards to the states of diffusion of immigrants, products, services, I, CDC stuff, BLM stuff, skills, etc.?

Reflection on Constitution-Induced Venezuelan Catastrophe

Venezuela has more oil than Saudi Arabia. The US did the “first” geological survey to determine this. The US needs to accept refugees from Central America so that the US can claim to an International Court that the US may have stake in Venezuelan assets. It would be nice to see the North American / South American entity sustainable with a low humanitarian cost. Keep in mind that with Climate Change, all of the frozen land in Russia and Canada will be virgin, fertile, and happy!!

Gambler’s Ruin Chain

Gamble with equal probability. Types of Gambles... States being DiffEq. Lifecycles... State Space $\psi = \{0, 1, 2, 3, 4, \dots\}$, 0 is absorbing state. Binary : win or lose.

Transition Matrix:

$$P(x, y) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \dots \\ q & 0 & p & 0 & 0 & \dots \\ 0 & q & 0 & p & 0 & \dots \\ 0 & 0 & q & 0 & p & \dots \\ 0 & 0 & 0 & q & 0 & \dots \\ \dots & \dots & \dots & \dots & \dots & \dots \end{bmatrix}$$

Think of how enticing lottery tickets are to some. The immigrants are brought in by the attraction from resources for them and their future children. Who is bringing the information regarding what they will receive if they enter the US. It seems that a disease could be

latent in their bodies - not being expressed for ten years. This is a biological perspective. There could be philosophies which are latent. This used to be more of a concept during the cold war periods - that certain philosophies could corrode American philosophies needed to maintain order.

Note: The issue with allowing individuals to CHOOSE attributes like gender is that this leads into the ability for hegemonic entities to discriminate based on philosophy; this leads to segregation.

Constitution → Powers of Congress → Units of Measure → Ratemaking, Reserving (Aggregate Liability) → Mortgage, Insurance, ... → Annuity: Regular Premiums from Individuals

States/Conditions on annuity. With annuity comes a transition in state guaranteed payment... ⇒ Uncertainty of Cash Flow.

Reserving Triangular Chain Method

Actuaries consider the losses for a certain time period to be random variables. Be wary of considering the job of risk management as mitigation and avoidance of negative risks - where the outcome hits the pocket book. For my internal and external marketing (after December), I prefer to manage the branding of my services in a message that accentuates my promotion of opportunity as well as prevention of loss.

$\pi(0)$ Stationary Probability Distribution - Peano's Postulates, Induction Hypothesis - if the initial state leads to an irreducible, positive recurrent, Markov Chain, then all the states are positive recurrent (i.e. they will eventually happen). Fitting the continuous time diffusion problems into the discrete skeletons of well-modeled stochastic chains is the approach which must be taken - keeping in mind the Markov Property (where all that is needed is the current state to predict the next state). One of the key time-based random variables was the exponential distribution because of all the properties of exponents. Remember how there are patterns on the "clocks" of each of the particles in the birth and death chains. There are patterns in the over-arching clocks. Kind of like how with the wave equation (hyperbolic) there is a group and phase velocity; but, we are focusing on parabolic equations because it is far too complex to consider the waves of influence that the diffusion of materials (i.e. migrants [for lack of better example]) has on the tertiary properties (concentric circles), cascading out from the properties immediately adjacent around the Ports of Entry.

Need to determine the stationary distributions...
from taking $P^n(x, y)$ as $n \rightarrow \infty$ use Spectral Theorem: $A = U[P(x, y)]U^{-1} \implies A^n = U[P^n(x, y)]U^{-1}, n \rightarrow \infty$. The process of determining the orthonormal eigenbasis (file compression with linear algebra) will be needed for quickly calculating stationary distributions - using the transition matrices. Remember the idea of complex random variables. Can a probability be complex? The answer is no. But, what if this agreement was challenged in the proper venues with the proper quorums.

How do the paths a refugee could go on - where they end up getting stuck in a relatively deterministic MC (irreducible recurrent loss and gain) - specifically the impact on property values around POE. Sociologically, (if I may be so bold) the virtue and vice spectrums which each of us have to deal could possibly be “eigenbases”... but this is beyond the necessary scope. We could look into this for the sake of horizontal growth.

The name of the game is to Optimize Real Estate Usage at Border POE. What are the **burdens** on these:

- Utilities
- Human Resources
- Crime
- Finance/Economics
- Consumer Items
- Roads
- Space Occupation
- Proximity
- Telecommunications
- Policing
- Fire, EMT
- Hospitals
- Travel (flight, train)
- Trucking
- IT, Data Infrastructure
- Legal System

We should need to generate stress test. Think about how a specialized stress test becomes a standardized test which is brought into the testing libraries at all manufacturers in the same industry. A standards committee needs to approve of these tests. At the most extreme, it is useful to know the particular tastes of the standards committees' members. Sanctioning by a standards committee (e.g. IEEE, ISO) is the act of taking on part of the responsibility of ensuring the standards have the utility proposed. Having a sanction allows for assurance within the manufacturers, and insurance companies provide the insurance. The insurance

companies have it in their best interest to perform predictive modeling so that they can foresee all possible losses. The disclaimers within the policies and the guarantees provided by governing laws and agencies protects the insurers. The same laws and governing agencies protects the assurers and the ensurers. A holistic model of the lifecycle of a specialized test becoming a standard gaining a sanction which ensures, provides assurance, and is backed up by insurance must be modeled. Might also want to consider the overlap between these domestic and foreign lifecycles.

In terms of the Silk Road, the Middle East is the largest POE on Earth.

Need insurance for assurance of:

- Maintenance of existing (as-is)
- Vertical / horizontal growth (to-be)
- Processes based on precedence

Establishes role model

(What was and what should never be!)

History of British Insurance Societies

Cannot self-guarantee (cosign). Guarantor must be form outside of co-operative

Fidelity Insurance:

- Takes into account personal character
- Nature of duties
- Supervision Required
- Moral Underpinnings

Provide tables to “accurately represent the condition and progress of a community as respects the births, marriages, and deaths; the ascertained or probable courses of disease and death in the individuals of both sexes, and the age at which dissolution takes place; the sexes of the children and their physical condition at birth; the mode of treatment pursued as their food, clothing, exercise, rest, etc., in health and sickness; the development of their mental and bodily powers...”

Joint Stock Companies Act of 1862 allowed for more freedom with incorporating - articles of association

Groups of: farmers, merchants committees, butchers, etc. came together, established raters, and aggregated liability (reserved) to determine likelihood of loss and set reasonable premiums in the 19th century, predictive modeling was not well developed because of the lack of data (Desideratum: something that is needed or wanted).

Inspectors / adjustors did not have adequate technology / techniques for predictive modeling of risks

Life(Cycle) Assurance: “... the great risks resulting from the storage of paraffin oil renders it inadvisable to issue policies of insurance to societies who store or sell such oil on their premises...”

With reinsurance, assurance cascades up and down from higher to lower societies. Fidelity insurance confirmed judgement of selection made. Guarantee Society (Honesty).

Product Lifecycle Management Tables (i.e. Life Tables).

Unvaccinated persons are not preferable.

In 1871, Sick and Burial handled by a few families. On one hand there is a monopoly. On the other, who really wants to do burial?

Ancient Order of Foresters.

Maieutic and Applicable Negotiations, Guarantees, and Opportunities (MANGO).

Vulnerability. Sanitation. 144 Societies in 1850-1880. Legality of insuring honesty of servants of societies for private employers. Water Insurance.

Theatrical Insurance:

- Effects on honor
- Effects on zeitgeist item ...

Actuarial Committee. Endowment and Annuity.

Traveling Representative: “to visit towns and villages in the immediate neighborhood of Manchester with the object of obtaining proposals for insurance from societies, companies, building societies, and private firms and also applications for stores” Also, to approach trade unions.

Newspaper Society

Difficult to compete with competitive prices (a priori). Tariff on insurance?

Fidelity Provisions: “That as an experiment we adopt the plan of the Provident Clerks and General Guarantee Assurance of requiring the person on whose behalf the policy is applied for, to execute an agreement to indemnify the Company in case of loss by embezzlement before issuing policy.”

Working within city ordinance.

“he that provideth not for his household is an infidel.”

Incapacity Benefit.

“... to control the heavy expenses which were the inevitable concomitant of expansion.”

“Friendly Societies... developed between 1815-1875... ways in which those with political power sought to protect themselves in an increasingly industrialized society.”

Chadwick: An essay on the Means of Insurance Against the Casualties of Sickness, De-crepitude, and Mortality. Government needs states on decision-making to prevent negative outcomes within working population.

Oddfellows

“No person shall be admitted above the age of 40 years...” to certain insurance societies. Why?

no payment for death without certificate of probable death given by doctor

Teetotalism

Railway Insurance. Shipping Insurance. Collateral Security. National Education.

The physical act of collecting insurance premiums must be considered. It is simple to add to the premium if someone does not pay. In the past, there was no ability to pay instantaneously, as is possible now with the internet. Though, people who were proactively posting the mail containing premiums before it was due could have been considered diligent and, therefore, should have earned a cut to their premiums.

The first insurance proposal from a Jewish person, in Britain, was not accepted until 1912. “The city of Manchester can only be compared to a gigantic hotbed of pestilential fermentation.”

War Time Influence on Insurance Societies

War contingencies felt. Volunteering for war cancels policies. I suppose one way to get out of a policy is to do this sort of thing. Are there any insurance policies that cannot be escaped upon written notice?

1900—

Coupling insurance with price of tea (other products). Imagine doing just with other products. “If you pay just \$9.99 more, we will throw in an insurance policy.” I suppose Best Buy does do this already. Because, what really is the product of an insurance policy. Once the policy has been signed, the person is just **assured**. There should be a smooth transition into assurance with a grand finale at the very end - a ritual, if you will. A milestone that someone can associate with the passageway from negligence into diligence. From liability into guarantee. From loss into opportunity. Coupling with advertising agencies and psychologists, but not getting weird with it.

Husbands and wives as joint members. privacy within the actuarial chambers of an insurance building - “sound-proof windows.” Reinsurance law.

In 1910, 200 weekly policies and 8600 monthly policies for primary insurance company in Britain.

“A departure from sound business and a step in the direction of gambling.”

Co-operative Union/Movement (evolved into a union) - Amalgamation

1914 war years effect on insurance aircraft insurance

Independent Actuarial Valuations

Having an actuarial newspaper.

1896, horseless motor carriages appeared. Premiums calculated on mileage basis. How does martial law effect current insurance policies and laws in general?

Purchasing power. Influenza claims. Post-war policies changed from data from war.

1920 Slump in trade required socialist propaganda: "The national coal strike was causing arrears in industrial assurance premiums."

Shifts in employment lead to new economies \implies unemployment insurance is a must.

Brought modeling into academia... Cambridge.

"Theoretically the owner of one motor cycle could be insured by the owner of another cycle, and a quid pro quo could provide the other party with an accomodation policy." Pensions, sabotage risk, clothing clubs. Upon salvage after accident, who has claim to reusable property? Must consider the entire lifecycle of a product (recyclability).

Industrial depression during 1930. Too much specialization of young people within any department. Specialization requirements at a very young age. The death of the Renaissance Man.

Insurance companies made a move into equities. "Considered the possibility of transferring all industrial assurance business to a public utility corporation which would have a statutory monopoly."

Salvation Army Assurance Society

1940 - Universal Insurance Company

Insurance-Based Value Conditioning

Using a crawl of the “CFO” blue words from Wikipedia:

Officers have special privileges within Insurance Policies. Then again, “relatives” are covered. When “key officers” are defined within the Bylaws of a corporate person, they then become “relatives.” What degrees or accreditations does each relative have?

Accounting View:

- Material Capital
 - Material Accounting Service
 - Insurance Management Service
 - Law Service
- Social Capital
- Scope Capital
- Overhead Costs
 - Supports Operations
- General and Administrative Costs
 - Salary
 - Staff Services
- Cash Flow from:
 - Operating
 - Investing
 - Financing
- Depreciation
 - Entropy of Property (Taxual)
- Amortization
 - Reduction of principal debt forms less interest
- Chief Information Officer
 - Managing electronic files in shared repository
 - Emailing Documentation
 - Security of Files

- Monthly Reporting
 - The name of the game is: **Budgeting**
 - Projections
- Audits (Review of Transactions)
- Internal Branding
 - Communication on Values
 - Look to clauses in Insurance Policies
- Gifting to family and friends
 - Turkey's for Thanksgiving
 - Birthdays
 - Quinceneras
- Research and education
- Medical
 - Intracorporate Prescriptions
- Scheduling
- Private Time
 - Breach of Privacy is considered "bodily injury"
- Security
 - home
 - Car
 - Cameras
 - Sensors
- Technology
 - Printers
 - Scanners
 - Faxers
 - Office Supplies
- Governance Functions
- Compensation for time and effort

- Talent
 - Development
 - Accentuation
- Reinforcement
 - Punishment
 - Reward

Defining Roles Within Trusts - Case Study

“A budget is what you stay within, when you go without” - Frank Hursley Jr.

- **Purpose:** To support Manager’s Wellbeing and allow Child1, Child2, and Child3 to not get burned out. This is the strategic, tactical, and operational roadmap for structuring the administration of a Family Estate.
 - **Note:** Manager is to be informed of everything below, and, if capable, Manager makes all final decisions.
- **Strategy:**
 - Designate 3 primary roles for cash flow management
 - * Financing
 - Child3
 - * Operating
 - Child2
 - * Investing
 - Child1
- **Tactics:**
 - Bring the family officers into a regular practice of utilizing the shared online Google Drive and Google Calendar
 - Financing File Management:
 - * Electronic copies of bank account and credit card transactions stored in shared folder
 - Discussion with Devin at Frost Accounting
 - * Passwords only held by Child3 and Manager
 - * Viewing rights given to Child1 and Child2
 - Refining of Powers of Attorney (POA):
 - * General Types of POA which John Garcia can write up:

- Special Powers: Limited to specific act or type of act
- General Powers: Allows for personal or business decisions
- Temporary Powers: Limited to discrete time frame
- * Current POA:
 - Medical
 - Financing
- * Proposed New Refinements of POA:
 - Financing: Approval of Overhead To maintain operations, Approval of Administrative Fees for Material Accounting Service, Insurance Management Service, Law Service
 - Operating: Property Management and Maintenance, Communications with Property Co-Owners
 - Medical: Doctor Communications, Scheduling, Medications, Health Plan
- * Discussion with Law Service
- Define Distribution of Manager’s Personal Belongings
 - * Time Frame
 - * Group Consensus
 - Quorum
- Financial Decision on Small Properties to Keep Operations and Tactics Running
 - * Property1 arbitrary value $\beta \in \$$ premium per year
 - Entire Property2 premium is almost equivalent to β
 - Property2 brings in significantly more cash flow than Property1
 - * Discussion with Stakeholders in Property1 must take place
 - * Approval from Investing Officer
 - * This is a stepping stone on property decisions

● **Operations:**

- CIO teaches everyone how to use:
 - * Shared Calendar
 - * Shared Repository
- Review Insurance Summary spreadsheet in FINANCING folder in Shared Repository
 - * Child2 and CIO talks with Insurance Management Service about first wave of questions
 - * CIO and Child2 generate presentable summary of findings and insight
 - * Discussion between Manager, Child3, Child1, Child2, and CIO takes place regarding insurance-related financing decisions
 - Buy needed technology before discussion to make presentation smooth

- Minimum monthly deliverables established so that we may relax and take pressure off of Manager
 - * Graduations
 - * Birthdays
 - * Parties
 - * Vacation properties
 - * Etc.

Risk Management Business Proposal

Enterprise Risk Management Processes		
BUSINESS CONTINUITY MANAGEMENT	SECURITY MANAGEMENT	FRAUD MANAGEMENT
AUDIT MANAGEMENT	INSURANCE MANAGEMENT	REVENUE MANAGEMENT: - Manage Policy Framework - Manage Operations - Support Operations

Deliberative Assembly:	μανΓΦ
Major Business Goals:	Independent Actuarial Valuation
Critical Success Factor (Metrics)	
- Actuarial Training	
- Natural Language Business Rule Processing	
- De-Centralized Risk Management Platform	

In order to generate Statements of the Probability of a successful introduction of an independent actua

Question

is independent actuarial valuation needed? Would documentation bring value to property owners around POE? ... increase property values? ... Reduce loss? ... Promote Opportunity?

Hypothesis

An introduction of this service has a 0.45 probability of success becoming an established service - bringing value to POE property owners and 10 people \$50,000 yearly salary (after taxes... \$35/hour).

Methods:

- Hypothesis Testing (Stats α value)
- Markov Chains (Stochastic Processes)

- Partial Differential Equations
- Systems Simulation
- Integrated Architecture Framework
- Zachman Framework
- Relational Model
- Object-Oriented Programming
- Surveys
- Focus-Groups
- Case Studies
- Marketing
 - Pamphlets, Presentations

Data Sources:

- Interviews
- Maps
 - Roads, Rivers, Mountains
- Financial Reports
 - 10K (sec.gov)
- Insurance Policies
 - Legal Clauses
- Data.gov
- Existing Property Valuations
- Financial Audits
 - City Halls, Council Meetings, City Ordinances, Zoning, public Records, Deeds
- Utilities Maintenance Records
- Local News
- Trade Agreements

- Product/Service Quotas
- Supply Chain Throughput
 - Trucks, Shipping, etc.
- Stocks, Bonds, Futures, Mortgages, etc.

Current Statistics at Yuma, Arizona POE (20180101-20190601):

50,000 Migrants diffuse across Yuma POE in one year
 About 10 POE across southern US border
 In Yuma, from 20180101-20181001, 50 migrants per day
 Week of 20190520, 500 migrants per day

Overarching Goals:

- Determine measures of success (\$50,000 per year per person involved)
- Determine costs of overhead and administrative fees to determine probability of success
 - Overhead: Must generate the experimental design per statement of success
 - Administrative Fees:
 - * Salary Per Hour
 - * Stock Options
 - * Must generate enough work for all employees (no idle hands)
 - * Must generate work contracts
- Keep meticulous documentation
 - Fuck Agile
- Mathematical Modeling of Uncertain Cash Flows
 - Select most pertinent Markov Chains
 - Generate wave and diffusion PDE (Look to Port Modeling Above)

Design:

- Determine Target Properties at and around POE
- Determine Boundary Conditions pertinent to Cash Flows
 - Look at zoning
 - * Retrospective, Current, Prospective
 - Look at actual economic activity on properties

- * Industry standard 10K (SEC) of archetypal company to set baseline for growth margins
 - Archetypal Company: Public Company which focuses solely on the economic activity of property
 - * Collect contact information of property owners, administrators (Points of Contact)
 - * Find Subject Matter Expert (SME)
- Isolate 3,7,12 variables
 - * The diffusion of which influence cash flows
- Determine clauses for MANGO (sub-committee of RiskRunners) from pertinent insurance policies
 - Generate Spreadsheets to Organize Insurance Policies
 - * INSURED_PERSONS
 - * INSURED_ENTITIES
 - * COVERAGE_SUMMARY
 - * COVERAGE_BROAD
 - * COVERAGE_ITEMIZED
 - * Clauses & Definitions
- Generate Graphical User Interface (GUI)
 - “Tableau”
 - * Visualization and Analysis
 - “Node.js”
 - * Forms for users
- Generate Work Contracts
 - Project the likelihood of indirect costs (Indirect Costs \implies Final Costs)
 - * Workflows, Change Management, Lifecycle of Indirect Costs...
 - Overhead Projections
 - * Administrative Projections
- Marketing Strategy
 - Art
 - Branding
- Scheduling
 - Setup meetings with Points of Contact

- Travel
- Operations, Tactics, and Strategies
- “Hamburger” cash flows to cover initial costs
 - * Per Diem
 - * Etc.
- A final review of the insurances that WE NEED
 - SO THAT WE CAN BE ASSURED THAT OUR INDEPENDENT ACTUARIAL VALUATIONS ARE SUPER LEGAL

Beginning of the Book: Responsibility Futures

Begin with the end in mind

Takaful

Now to begin

The premise is that there are entities within America who are locking in the responsibility distribution of groups of people, with the promise that the target group of people will act a certain way. Keep in mind that a box of cereal always costs the same. This is because financial futures lock in the price of wheat and corn for a later time to be bought and sold. The responsibility distribution is seen as follows:

$$Responsibility = \frac{Diligence}{Negligence}$$

We should focus on a group of individuals, rather than the diligence and negligence within single individuals. The ideal responsibility distribution depends on the policy objectives. A ship may only need a 0.1 R distribution to establish trade routes; whereas, a group of scientists will need a 0.9 R when they are trying to generate a medicine. (I had never considered the idea of the Responsibility being a distribution until right now). We must consider how the diligence and negligence must be measured quantitatively. So, we look to the definition of negligence. Much of this is contained in the Nautilus notebook. But, what is new, is the concept of Responsibility being a **Random Variable**; and, this comes very naturally from how I set up the equation. Reducing the variability and uncertainty of cash flows is the intention of creating financial futures. Using the Language of Happiness (the mapping of material capital to scope and social capital), we can glean the process of reducing the uncertainty involved with the “cash” flows in the social and scope capitals.

Memorial Weekend Framework for Proof of Following Statement

There exists conquering such that for all states, the material of solidarity is the equivalent in all states.

Proof.

“War isn’t a ying - yang scenario.

There isn’t one war shamer for every monger.

There isn’t a balance that gets slightly skewed to one side and then the universe corrects itself to the proper alignment.

The trajectory is a direction of unjust survival.

It isn’t a team effort.

It isn’t a game that, once one, will provide an infinite utopia in which all creatures are optimally distributed into their specific environment.

The absence of war is the outlier.

Conflict is the norm.” - Daniel Buff

“Not all people are voting online.

After everything was conquered by crusaders, there were established new sets of order.

Competition for advantageous attributes arose.

The indicator of the advantageous attribute was subtly noticeable.

The limit of advantageous attribute competition was genocide.

Philosophical advantage was identified as “rationality/justifiability/utility.”

Example is how Amoeba survive.

The market or forum allows for identification of advantageous attributes.

We were not, are not, and will not be anyone else but ourselves.

Then, we could not have been born as someone else.

Therefore, there exists conquering such that for all states, the material of solidarity is the equivalent in all states.” - Jefferson Richards

□