Support for Rules and Logics from Diurn to Lump Sums.
Welfare.

We define Support: *Support*(f as a Role) $: E \to [E - \{0\}]$ and finding $f_1 + f_2 + .. + f_n$ Refferal is for OwnerShip and disposition of Business. n **is the Buy Out**.

The Function and Intervention and Suffering..
(s_i, y_i) is given where successes s_i wait (as seen before) and $f : x_1 \to y_i$ where $f(g(x_i)) = f \circ g(x_i)$ as $g(x_1), g(x_2), .., g(x_n)$ try to pass as valuable and with discrete representation, f called *abnormal in effect* and *g corrector*. Here $(f \circ g)^{-1} = g^{-1} \circ f^{-1}$. We address x_i as percentile evaluation if ordered. To enlarge x_i by a larger sample, we know that the current standard value σ leads to the new σ_n as $\frac{\sigma}{\sqrt{n}} = \sigma_n$. Namely to reduce σ by $\frac{1}{2}$, σ_2 we need $2^2 n = 4n$ data. $x^j = \begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos\varphi & -\sin\vartheta \\ \sin\varphi & \cos\varphi \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = x^{j+1}$, a rotation of φ in time $x^i \to y^i$. If $\varphi = 45^0$ then $A^{adj} = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{bmatrix} : \varphi^j \to \vartheta^j$, where $x^j \to y^{j+1}$. The syndicate description is $(\sin x \to \frac{\partial \sin x}{\partial x}) \to (\cos x \to \frac{\partial \cos x}{\partial x})$. To Relax the Phases we have a procedure $O(n)$ in $x_k^* = \begin{bmatrix} x_1^k & x_2^k & \dots & x_n^k \end{bmatrix}$ with $x_i^k \pm 1$.

Preference relation Ordering for Self Determination.
(introducing preference relation $\succ$): $x \succ y \Rightarrow x$ at least as good as y, with $U(y) \leq u(x)$ as a command and U an utility function that its bound, where $u(x) \approx u(\overrightarrow{x})$ on $u(\overrightarrow{x}) = \max_{\overrightarrow{x}}(p\overrightarrow{x} = m)$, where p are women and m the public. $u(x)$ may be a Lipschitz function: $(u(x) + u(y) \leq Ku(x + y))$ for i Assets (on x_i) on Investment Self Determination as Separation of $\max_{\overrightarrow{x}}(p\overrightarrow{x} = m)$ and projection K. The Spaces S are of all construction set $\{x_i\}$, $u(x_i) \in W$ the operating set, and $u(y) \perp W \subset S$ is resultant of lack of y..

Elasticity. (physical and not physiological property)
The muscle from rest under from influence of a charge stretches. (and have an *allongement*) (If the charge grows then, $x_i \to y_i$ with x_i as a weight at times t_i, then $y_i = f(x_i)$ shown as f increasing concave up and if there is contractility (perfect physiological tétanos) the curve is convex up with $x_i \to y_i$ with $g(x_i) = y_i$. (the explication is that elasticity produces contractile substances known as *visco-elasticity*.). It is known that elasticity is ranging from accommodation to support and remediation on the computer.

Flexiblility.
The initial value are positions that are restful and relaxing (stretching and breathing of the muscle). We define **Relaxation and Worry Free Exercise**. (Einschränkung und Sorge freie Ausübung). In a $0 - 1$ **integer** program relaxation where the satisfaction $a_{01}x_1 + a_{02}x_2 + \ldots + a_{0n}x_n$ (also called cost) is better when a problematic constraint j, would be $a_{j1}x_1 + a_{j2}x_2 + \ldots + a_{jn}x_n \leq b_j$. Clearly the candidate x_i^* at optimum is relaxed where x_k^* is to be added 1 or substracted 1, at dimension k, on $1 \leq k \leq n$. Here we have an $O(n)$ search on $(x_1 x_2 \ldots x_n)$.

Yet if constraints $j \in \{1;2;3..\}$ and $i \in \mathbb{N} - \{1;2;3..\}$ then we have constraints $A_j x \leq b_j$ and $A_i x \leq b_i$. This may be changed in

$$\max c^{\perp}x + \lambda^{\perp}(b_i - Ax) \quad \text{on} \quad A_j x \leq b_j, \Rightarrow c^{\perp} \cup \lambda^{\perp}$$

(also called *Lagrangian Relaxation*). At this point we relax the first worry or concern, namely the constraint i. Here $\lambda = \begin{bmatrix} \lambda_1 & \lambda_2 & ..\lambda_n \end{bmatrix}^{\perp}$ is called the dual parameter. The codomain relaxation problem is stated as:

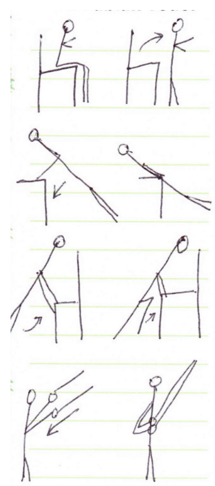
$$\min P(\lambda) \ \text{ such that } \ \lambda \geq 0, \ \text{ and } \ P(\lambda) = \max c^{\perp}x + \lambda^{\perp}(b_i - A_i x) \ \text{ on } \ A_j x \leq b_j \Rightarrow \lambda$$

The penalty of the chosen constraint, alters the polytope as from the algorithm of Chernikova. A direction method is written as $\min_{x,y} f(x) + g(y)$ on $x = y$. The direction is given by the space $y \in \mathbb{R}^n$. There is no b_j upper bound.

For parallelism belief, we have for each constraint $a_j^{\perp}.x \leq b_j$ known as $\frac{\lambda^j e^{-\lambda}}{j!}$ from the Poisson Process. There is ordering in the domain i and j.

The flexibility is found by breathing and relaxing.

The **sets of Organs** are close to:
$\{cou, épaule, bras, avantbras, dos, abdominaux, positive, fessiers, cuisses, molets\}$,
$\{neck, shoulder, arms, forearm, back, abdominal, positive, buttocks, thighs, molets\}$
$\left\{Hals, Schulter, Arm, Unterarm, Rücken, Bauch, positiv, Gesäß, Oberschenkel, molets\right\}$



The Act of Sex as by movements (Operator at limit in Exercise).
The Algorithmic Operator: $\Delta y_k = y_{k+1} - y_k$.
The *Further* Operator: $E y_k = y_{k+1}$
The Linear Operator L: $L(c_1 y_k \pm c_2 y_k) = c_1 L y_k \pm c_2 L y_k$
The Product Operator L: $L_1 L_2 y_k = L_1(L_2(y_k))$
The Equality Operator: $L_1 y_k = L_2 y_k \rightarrow L_1 \equiv L_2$
The *Inverse* Operator: $L_1 L_2 y_k = L_2 L_1 y_k$ with $L_2^{-1} = \frac{1}{L_2}$
We know $E = 1 + \Delta$, you apply Δ on concentric circles on the skin.
We also know $E\Delta = \Delta E$, and $\Delta^2 = E^2 - 2E + 1$.
The **Backward Operator**: $\nabla y_k = y_k - y_{k-1}$.

We also have: $\nabla E = E\nabla = \Delta$ a Relaxation procedure in front of Furtherence.
The **Central Difference Operator** (*Loss and Homeostasis Conviction*)

$$\delta = \sqrt{E} - \frac{1}{\sqrt{E}} = \sqrt{E} - 1 : \sqrt{E}.$$

The **Averaging Operator**: (*Recuperation*)

$$\mu = \frac{1}{2}\left(\sqrt{E} + \frac{1}{\sqrt{E}}\right)$$

These Operators are applied to $y_k : k \in \mathbb{N}$ with $\nabla y_k = \Delta y_{k-1}$ by **Pressure**.
Example of Homeostasis.

$$\delta\sqrt{E} = E - 1 = \Delta, \qquad \Delta^n = \delta^n\left(\sqrt{E}\right)^n, \qquad \Delta^n y_k = \delta^n y_0$$

in presence of $x_i \to y_i$, as if $x \in X$ and $y \in Y$, we know that X are the exterior of the body and Y the interior or reversed, then $X \cap Y \equiv \emptyset$ as Homeostasis (healing) of the Pupil.

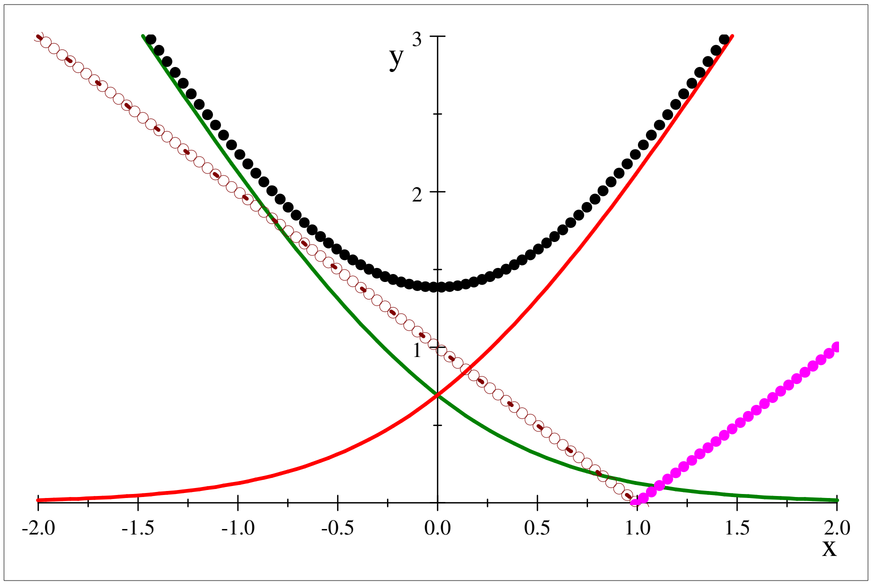
Occurrence in Society.
Clearly from the cluster $\{a_1, a_2, .., a_n\}$ we have a classification exercise that is well determined as below. The determining data is (x_i, y_i), $y \in \{0;1\}$, and $y = h_\vartheta(x)$ as seen also called hypothesis. We know $0 \leq h_\vartheta(x) \leq 1$. We call for $h_\vartheta(x)$, $g(x) = \frac{1}{1+e^{-x}}$ a sigmoid. We call h_ϑ a probability and $y \in \{0;1\}$. We say h_ϑ is the estimated probability that $y = 1$ on input x. (close to a root)

$$\Pr(y = 0 \mid x, \vartheta) = 1 - \Pr(y = 1 \mid x, \vartheta) = 1 - h_\vartheta$$

So if $y = 1$ then $h_\vartheta \geq p$ and $g(x) \geq p$ with $h_\vartheta(x) = g(\vartheta^\perp x)$ when $z = \vartheta^\perp x \geq 0$.
If $y = 0$ then $h_\vartheta < p$ and $g(x) = p$ with $h_\vartheta(x) = g(\vartheta^\perp x)$ when $z = \vartheta^\perp x < 0$.
To remember $h_\vartheta(x) = g(k(x))$, and we call $k(x)$ a simple boundary determining relation in between x_i and ϑ_i in front of probability p. The logistic classification turns to a regression: $\min J(\vartheta) = Cost(h_\vartheta(x), y^i) = \frac{1}{m}\sum_{i=1}^{m} \frac{1}{2}\|h_\vartheta(x^i) - y^i\|$ and

$$Cost(h_\vartheta(x), y^i) = \left\{\begin{array}{c} -\log h_\vartheta(x) \text{ if } y = 1 \\ -\log(1 - h_\vartheta(x)) \text{ if } y = 0 \end{array}\right\}$$

If $y = 1$, $Cost_1(h_\vartheta(x), y^i) = -y(\log(h_\vartheta(x))$, and if $y = 0$, $Cost_0(h_\vartheta(x), y^i) = -\log(1 - h_\vartheta(x))$.
We also say: $\min J(\vartheta)$ helps in predicting output $h_\vartheta(w) = \frac{1}{1+e^{-\vartheta \perp w}}$ as $\Pr(Y = 1 \mid w, \vartheta)$.
If $y = 1$ you want $\vartheta^\perp x \geq 0$ and if $y = 0$ you want $\vartheta^\perp x \leq 0$.
Here we plot: $-\log\frac{1}{1+e^{-2x}} = Cost_1$ in green and $-\log(1 - \frac{1}{1+e^{-2x}}) = Cost_0$ in red.
$-\log\frac{1}{1+e^{-2x}} - \log(1 - \frac{1}{1+e^{-2x}})$ is with dots and is to be smallest at $J(1.5)$ setting $\vartheta = 2$.



The Logistic Regression (Support Vector Machine) is known as:

$$\min_{\vartheta}(C\frac{1}{m}\left[\sum_{i=1}^{m} y^i(-\log h_{\vartheta}(x^i)) \ + (1-y^i)(-\log(1-h_{\vartheta}(x^i)))\right] + \frac{\lambda}{2m}\sum_{i=1}^{\lambda}\sum_{j=1}^{n}\vartheta_j^2)$$

with $-\log\frac{1}{1+e^{-\vartheta x}} = Cost_1(\vartheta^{\perp}x^i)$ and $-\log(1-\frac{1}{1+e^{-\vartheta x}}) = Cost_0(\vartheta^{\perp}x^i)$.

For the case $\vartheta^{\perp}x \to z+y = 1$ we see $\vartheta^{\perp}x \geq 0$ seen as $\vartheta^{\perp}x \geq 1$ in magenta as dots above.
and $\vartheta^{\perp}x \to z-y = 1$ we see $\vartheta^{\perp}x \leq 0$ seen as $\vartheta^{\perp}x \leq -1$ in brown as dots above.
$Cost_1(\vartheta^{\perp}x^i) \approx \vartheta^{\perp}x \geq 1$ and $Cost_0(\vartheta^{\perp}x^i) \approx \vartheta^{\perp}x \leq -1$ is a feasible set. (a downward triangle)

The Support Vector Machine Boundary is defined as:
$y^i = 1 \to \vartheta^{\perp}x \geq 1$ and $y^i = 0 \to \vartheta^{\perp}x \leq -1$.
Why so ?

As: $\min_{\vartheta} C\vartheta + \frac{1}{2}\sum_{i=1}^{m}\vartheta_i^2$ such that $\vartheta^{\perp}x \geq 1$ if $y^i = 1$ and $\vartheta^{\perp}x \leq -1$.

The Boundaries are known as Margins, and separable hyperplanes $\vartheta^{\perp}x \geq 1$ and $\vartheta^{\perp}x \leq -1$.

Occurrence of $y = 0$, is clear at $x = 1$ for $y = 2x = \vartheta x$. The Big Data is known as $(r,\vartheta) = (\vartheta, 2\vartheta)$ as (x,y) cartesian. (This is called a polar description of relationship of (x,y).). This is an Angular Occurrence. (angle as a parameter)

Occurrence and Relaxation.

The Delay is defined as a difference inbetween the application of external stress to the response of the system. The means are iterations to solve $Ax = b$. (the method of Jacobi). From $A = D-(E+F)$ we introduce the linear iteration $x^{i+1} = D^{-1}(E+F)x^i + D^{-1}b = Jx^i + b'$. From x^0 we have the suite $x^1, x^2 \ldots$. The matrix $D = (a_{ii})$ is a diagonal matrix made from diagonal of A. The E matrix is made from the

lower sub-part of A, namely $E = \begin{bmatrix} 0 & 0 & 0 \\ a_{21} & 0 & 0 \\ a_{n1} & a_{n,n-1} & 0 \end{bmatrix}$, and $F = \begin{bmatrix} 0 & a_{12} & a_{1n} \\ 0 & 0 & a_{n-1,n} \\ 0 & 0 & 0 \end{bmatrix}$.
Clearly the space is $Ax \lesseqgtr 0$ and the comeback from equilibrium is $Ax = b$ after excitation.

Clarification.

Definition of the Training Difficulty as a Low Performance Learning Task.

In the Learning Context, we move from Data as Training Values toward scores on Board States. The Training Difficulty is met as a mapping of Scores to the Game Status, that is rather On or Off and not more precise. It is: $(x_i, y_i) \to [s_1, s_2, .. s_k]$ as a Board B. B is known as an automobile Board. On B we have an order $[s_{k_1}, s_{k_2}, .., s_{k_k}]$ where s_{k_i} is in B, setting B well as a Well Posed Problem. This is an ambiguity from data in the aim to define a good B. We may present the problem as

$$(x_i, y_i) \to b \to V_{train}(b), \quad \text{where } b \in B.$$

By $V_{train}(b)$ we understand a good training algorithm on training values (x_i, y_i) and the estimation of it is called $\widehat{V}$. We have:

$$\widehat{V}(successor(b)) \leftarrow V_{train}(b)$$

and call it the Learner's Current Approximation of V. By $successor(b)$ we mean a learning program moving from b to its successor also called opponents response.

V_{train} (a good training algorithm) tends to be more accurate for some good Board States $b_s \in B$, $s \in \{1, 2, .., k\}$ rather big. Why big ? Because: $(x_i, y_i) \to b \to V_{train}(b)$, where $b \in B$, selects the good $b \in B$ as $O(n)$ in B. The specification Task is a Well Posed problem in front of the Program, meaning for a good Learning Algorithm. This is an ambiguity from data in the aim to define a good B. We say V_{train} trains the Data.

The Critic (**citizen**) **and History**.

By History we mean: $(x_{i_k}, y_{i_k}) \to Target$. The *Target* is $\widehat{V}$ from V_{train}. We write: $\widehat{V}(successor(b)) \leftarrow V_{train}(b)$, as reversed, and not forward. The success of V_{train} is controversed, as a good Learning Algorithm is a Well Posed Problem if it is found. At object it may be with associative memories.

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Deciding what to Try Next in front of the Training Difficulty.
Maximization Algorithms are met in Training Recognition.
In the decision, we may add that:
1. In front of regularization you do not need more training examples.
2. A lower Set of Features is well if it is less energetic: it defines Bias on Data. In this case we have on (x_{i_k}, y_{i_k}), the $J_1(\vartheta)$ and $J_2(\vartheta)$ (both known on varied sets of (x_i, y_i)), (where $J(\vartheta)$ is trained in the maximization of the Learning Algorithm), and are asymptotic if the size (number of) of (x_{i_k}, y_{i_k}) grows. this feature is also called : Error Analysis.
3. There may be need of additional Features.
4. You may de-regularize (insight of regularization)

The Hypotheses fail to generalize to new training values as it is recognition.

There is an additional paper on: Supervision and Specialization in Asia.

Work as Function. $f : (r, \vartheta) \to \mathbb{R}$ and is continuos, we know Area as $A = \frac{1}{2}\int_a^b f^2(\vartheta)d\vartheta$ and length $L = \int_a^b \sqrt{r^2 + \left(\frac{dr}{d\vartheta}\right)^2}\, d\vartheta$ is the Operatory Direction with Input Error.
Stammfunktionen sind: $F(x) + C = \int f(x)dx$. The *Article de Presse* and *Lettre* (r_i, ϑ_i), $i < N$, where $g(x_1), g(x_2), .., g(x_n) \in \mathbb{R}^n$ and Steps are at $f(t_j)$ with $t_j \in [t_j, t_{j+1}]$ converging uniformly to polynomial f_∞ on $[a; b]$ and Stammfunktion $F(x) + C$, and where piecewise continuity is *affine* at interpolation in $[t_j, t_{j+1}]$. From Length and Area we see Algorithm with no Favour. Worry comes from Error in Input and wrong Algorithm. We want Freedom and a Fiscal Year. L'engagement et la Relation: la Déclaration $f_k : k \in \mathbb{N} \to [0; 1]$ the private proposition, and to $k \to \frac{\lambda^k e^{-\lambda}}{k!}$ where λ is close to k from observance of f_k. We want to find a Support as from Montréal and Cluj and Freindship. From 1 to λ we have a suite $\{n_1, n_2, .., n_\lambda\} \subset \mathbb{N}$, and this is called Support in Itinerary from the private Proposal in k steps.

The Support Set are sets D of the domain of f, in relation to Codomain C including the Range. The set is $f^{-1}(C) \rightsquigarrow D$, where the Null Space is not in C and finite. The C is cumulative. f is smooth on $I \subset \mathbb{R}^k$, if $\exists \frac{\partial f}{\partial t} = f'$ continuos on I. A small change in $x \in I$, only gives a small change in slope of *f*, at this x. We need to find paths lengths. We define the Stammfunktion $s(x) = \int_a^x \sqrt{1 + f'(t)^2}\, dt$ is the arc length function. The Diffraction Law is: for partition $a < x_1 < x_2 .. < x_n < b$ we have

$$[x(t)]_{[a;b]} \to [x^i *]_{t \in [a;b] \cap \{a, x_1, x_2 .. x_n b,\}}$$

It is a norm if the support is assumed as $x(t) : t \to [x^i *]_{t \in [a;b] \cap \{a, x_1, x_2 .. x_n b,\}}$ and we have a good partition, with little n. The transformation in front of data, is close to the $g(x)$ corrector. Namely: $f : x_i \to y_i, f(g(x_i)) \ : g(x_i) \to y_i$, with $[g(x)]_{[a;b]}$ correcting to $[g *]_{t \in [a;b] \cap \{a, x_1, x_2 .. x_n b,\}}$ where the partition is done in front of data. The function *f* is *abnormal in effect* and g *corrector,* both equations related to admissible functions. The equation is in relation with meeting Needs, Defense and Reproduction and lead to Rewards and Occasion (into Qualification). We have a family of functions: $f : (A, B) \to y = A(x - B)^2$ (two degrees of freedom, both degrees determining a family of curves common at a differential equations) and in this case a Parabola. A is the price, $(x - B')(x - B'') \approx (x - B)$, where root 1 at B' is defense, 2 reproduction at B'', and $(x - B')(x - B'')$ meet Needs. We differentiate $y' = 2A(x - B), \ y'' = 2A, \ A = \frac{y''}{2}, y' = y''(x - B), \ (x - B) = \frac{y'}{y''} \to A(x - B)^2$, $y = \frac{y''}{2}\left(\frac{y'}{y''}\right)^2, \ y'' = \frac{(y')^2}{2y}$. This is called a second order equation for a two parameters. The equation and application to function is to be in Conflict, where a Pure Strategy is adopted before determinate probabilities. As we have, $(x_i, y_i) \in \mathbb{R}^2$, with $\|(x_i, g(x_i))\| = \max_{t \in [0;1]} |x(t)|$, and $g(x) : x_i \to y_i$.

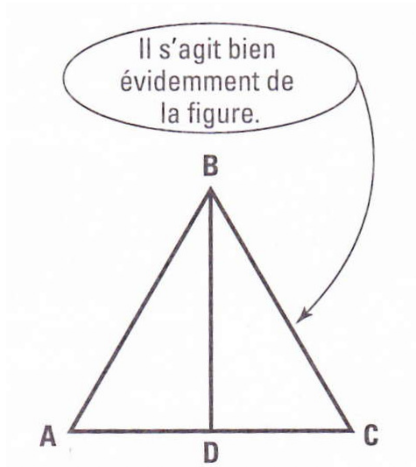
Work and Freedom. (**die Algemeine Formels für Würtzeln**).

$$y(x) = x^n - c^n = (x - c)(x^{n-1} + x^{n-2}c + x^{n-3}c^2 + \ldots + xc^{n-2} + c^{n-1}) = (x - c)\sum_{k=0}^{n-1} x^{n-k-1}c^k.$$

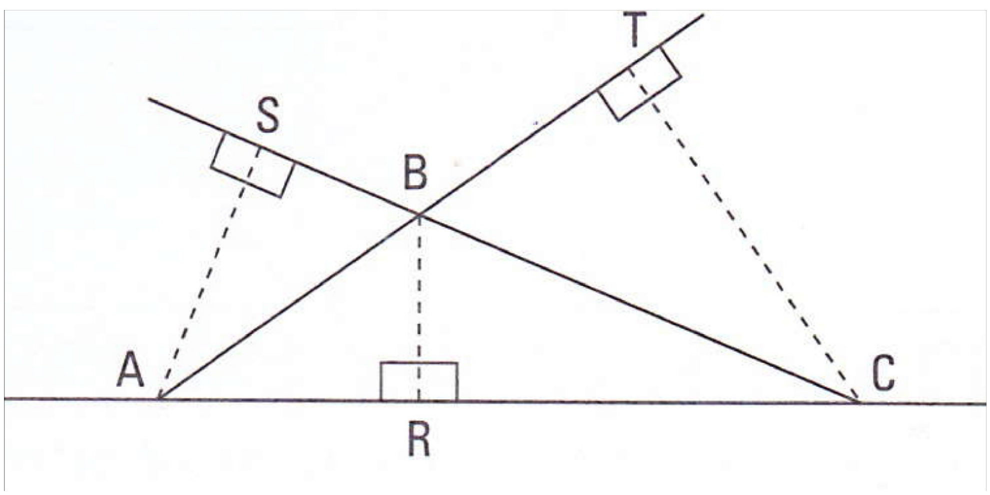
Here we have roots and recall the corrector $[g *]_{t \in [a;b] \cap \{a, x_1, x_2 .. x_n b,\}}$. Hier n ist bleibig. We call $\gamma(x) = 0 + x + x^2 + .. + x^n = \frac{x^{n+1} - 1}{x - 1} - 1$ that is written upside out of c_i, and from Weierstraβ we know that *f* is continuos on a compact interval and developable uniform series of convergent polynomials.

About the Equidistance of the natural Parameter.

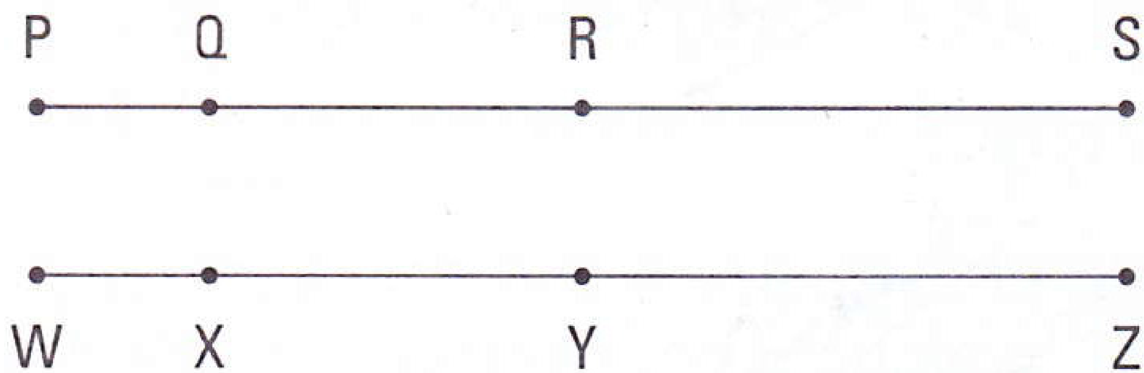
If we have the lengths C_1 and C_2, we expect C_3 to be the smallest. This is called the Principle of Inequality of Triangles. If our triangle is complete as $C_1C_2C_3$ then the triangle has 3 Heights. We call the percentile of a_n the $(100 - n)\%$ as the n percentile and we sort the quantities.



A *natural Problem with Equidistance* is the following: determine that angles are the same if the triangle has identical sides. The Hypotheses are: If ΔABC is isosceles, and BD is a Bissectrice, we have 5 statements: 1) The Hypothesis BD is Bissectrice of angle $\triangle ABD$ justifying $AD = DC$, a mediatrice. 2) Hypothesis $\triangle A$ is complementary to $\triangle ABD$, (namely the sum of the two angles is $\frac{\pi}{2}$ as Phases) Justifying $\triangle A + \triangle ABD = \frac{\pi}{2}$. 3) Hypothesis $\triangle C$ is complementary to $\triangle CBD$ then the Justification is: $\triangle C + \triangle CBD = \frac{\pi}{2}$. 4) Sides $AB = AC$, 5) We proved by homologation of $C_1 C_2 C_3$ that the triangle has equal sides, and therefore $\triangle A = \triangle C$. QED. We have to mention that if the angles are complimentary they sum to $\frac{\pi}{2}$ in Phase and supplementary to π as a Command.



The natural parameter appears as $\vec{y}(t) = \vec{a} + t\vec{v}$ and $\vec{y}(t) = \vec{a} + \alpha t\vec{v}$ for the degenerate length. $\vec{y}(t)$ is parametrized by arc length $\int_a^b y'(t)dt = \int_a^b 1dt = b - a$. Clearly the supplemental parameter α, does not change anything. Convexity is defined as Curvature $k = \det(\vec{y}''(t) \mid_{t_0})$. Stammfunktionen sind: $\int \frac{1}{x^2 \pm a^2}$ und $\int \frac{1}{\sqrt{x^2 \pm a^2}}$ close to the necessity of translation and Group. Clearly $F(x)$ is wanted continuos as $\int_1^t \frac{1}{x}dx = \log t$ and where the problem of Cauchy is $y' = y$ with $y = y_0$ solving to $\exp(t) = 1 + \frac{t}{1} + \frac{t^2}{2!} + \ldots$ approximated by $\exp(t) = \lim_{n\to\infty}(1 + \frac{t}{n})^n$ a fiscal year. It is known that the **Median** is the middle value when the a_n are arranged in order of magnitude of effort in x_i and y_i, and the **Mode** the value that occurs the most often (as a period) in y_i. The congruence in between two triangles as $C_1C_2C_3$ and $C'_1C'_2C'_3$ is called a **Lobby** where you win with no angle ϑ. If we have C_1AC_3 with angle A, a well formed argument, the cone $Ax \geq 0$ of hyperplanes $a_{\cdot i}x \geq 0$ with a **Height** h equal to a convex combination of rays x_k^* from the summit into C_1, we call h *équivoque* of C_1C_3.



About the suite of roots, we have the Algemeine Formeln that are multidimensional and annul themselves as we find root after root. In the case of two dimension through two Segments that are parallel, namely PS and WZ, we have the following Proof in 3 sentences: If you have $PQ = WX, PR = WY, PS = PZ$ when we have the first dimension $PQRS$ and second $WXYZ$. The Proof says: 1) If $PQ = WX$ and $QR = XY$ then $PR = WY$, and 2) If $PR = WY$ and $RS = YZ$ then $PS = WZ$. QED. The Segments are $\sqrt{x} = \sqrt{y}$ where $\sqrt{x} \approx \frac{PR}{PS}$ and $\sqrt{y} \approx \frac{WY}{WZ}$ and $\sqrt{x} \approx \frac{PQ}{PR}$ and $\sqrt{y} \approx \frac{WX}{WY}$.

Operation an den Wurzeln zu verbessern Verschwinden (**Operation sur l'amélioration de la disparition des racines**)

$\Delta y_k = y_{k+1} - y_k$ and $Ey_k = y_{k+1}$ where lack of comfort is $E = 1 + \Delta$ and the presence of acquaintances of payoff with gain as $\Delta^k = \sum_{k=1}^{n}(-1)^i C_{k,i}E^{k-i}$ as $\Delta^2 = E^2 - 2E + 1$, $\Delta^3 = E^3 - 3E^2 + 3E - 1$ and son on. Also $\nabla y_k = y_k - y_{k-1}$ where $\nabla E = E\nabla = \Delta$ to find phases (also called $next(2along) = 2along(next)$). We know $(x-c)$ in $y(x) = x^n - c^n = (x-c)\ (x^{n-1} + x^{n-2}c + x^{n-3}c^2 + \ldots + xc^{n-2} + c^{n-1})$ close to common goods and masculinity (different steps in iteration and association).

Inversion of the Problem.

$f : U \subset \mathbb{R} \to \mathbb{R}$ and $f_n : U \to \mathbb{R}$ and $\frac{\partial f_n(t)}{\partial t}$ are continuos and differentiable, then $f_n(x \in U) = y_n$ at x_0 and y_0. If $\left\| \frac{\partial f_i(x_0)}{\partial x_j} \right\| \neq 0$ then $\exists f^{-1} : \vec{y} \to \vec{x} \mid_{x_0 y_0}$

Stabilité et Consistance.

$u_n : E \to \mathbb{R}$, with $u_n \to u_n(g)$ or $u_n(f)$, If $\|u_n\| < n, \forall n$. then $\|u_n(g) - u(f)\| < M\|g - f\| + \|u_n(f) - u(f)\|$ as $\forall(f, g) \in E$, You have to know f, and there is a little error on $f \to \exists g$, natural parameter of t, and help in Community. It is unstable if $\|u_n\| \nless M \forall n$, $\exists g_n \in E$ such that $\|u_n(g_n) = u(f)\| \to \infty$ as $g_n \to f = g_\infty$.

The Consistence is defined as: how to link u_n with $u_n(f)$?

$u_\infty : E \to \mathbb{R}$, $En \subset E$, $\bigcup_{n=0}^{\infty} E_n = E$ (dense), u_n consistent if for $\phi \in E_n$, $u_n(\phi) = u_\infty(\phi)$ on E_n. ϕ complete with invention.

Arbeit, **Wegelänge und GramSchmidt Vorsprung** (**Projection**).

$\{x^i\} \ |_n \ \in X$ ein preHilbert Raum (aus Hofjuden am kleines i), $\exists\{e_1, e_2, .., e_n\}$ so wie $\langle e_i, e_i\rangle = 1$ und $\langle e_i, e_j\rangle = 0$, wo $e_i = \frac{x^i}{\|x^i\|}$ und mit das Verfahren (Procédure) $z^2 = x^2 - \langle x^2, e_1\rangle e_1$ mit und der Umfang (Perimètre) oder Kreisbogen $x^2 - |x^2|e_1$ wie $a(1 + n\cos\vartheta)$ wo n ist die Zeit. Einige gute Phasen y^k sind (Projection Vorsprung Sport) sind mit $y^i = [x^i] \ |_{1,..,n}$ wo $\langle x - \alpha_1 y^i + \alpha_2 y^2 + \ldots + \alpha_n y^n \ | \ y^i\rangle = 0 \ \forall i = 1, 2, \ldots, n$.

The Problem of Phases and Commands at Work and the GramSchmidt Projection.

We have the phases $\{x, u\} \in \hbar$ where $\min J = \int_0^T (x^2(t) + u^2(t))dt$ with $x'(t) = u(t)$ and $x(0)$ constant facing commands growing as the problem grows. We want to reduce $x(t) \to 0$ as $t \to \infty$ by suitable application of a command (Control) $u(t)$. The $\|x(t) + u(t)\|^2$ is the pitch. In $x'(t) = u(t)$ and $x(0)$ we have $x(t) = x(0) + \int_0^t u(\tau)d\tau$ where $\hbar = L_2[0;T] \otimes L_2[0;T]$ of square integrable $x(t)$ and $u(t)$. (es ist einfach stetig) Es ist ein Stammfunktion der Command $u(t)$, mit $u(x) = \int_0^t u(t)dt$ Stamm-antiderivative by primitives. On $\hbar$ we have the inner product $((x^1, u^1), (x^2, u^2)) = \int_0^T [x^1(t)x^2(t) + u^1(t)u^2(t)]dt$. Also $((x^1, y^1), (x^2, y^2)) = \int_0^T [x^1(t)x^2(t) + u^1(t)u^2(t)]dt = \|(x, u)\|^2 = \int_0^T [x^2(t) + u^2(t)]dt$ with

$$\min J = \min_{u \in V\perp, x \in V} \|(x, u)\|^2$$

By the Spaces $u \in V \perp, x \in V$ we mean to apply the GramSchmidt Procedure.

The Problem of Commerce.**Das Problem des Handels**.

The space $\hbar$ of Phases and some Commands has a basis $\{y^i\}$, where we know $\langle x, y^i\rangle = c^i$ as $x \in \hbar$. The coefficients of y^i are β_i in $x = \beta_1 y^1 + \beta_2 y^2 + \ldots + \beta_n y^n$ where:

$\langle y^1, y^1\rangle\beta_1 + \langle y^2, y^1\rangle\beta_2 + \langle y^3, y^1\rangle\beta_3 + \ldots, \langle y^n, y^1\rangle\beta_n = c_1$
$\langle y^1, y^2\rangle\beta_1 + \langle y^2, y^2\rangle\beta_2 + \langle y^3, y^2\rangle\beta_3 + \ldots, \langle y^n, y^2\rangle\beta_n = c_2$
....
$\langle y^1, y^n\rangle\beta_1 + \langle y^2, y^n\rangle\beta_2 + \langle y^3, y^n\rangle\beta_3 + \ldots, \langle y^n, y^n\rangle\beta_n = c_1$

At roots of β_i with $c_i = 0$ there is little Affliction. At Commerce $c_i \neq 0$. (Zionism)

Late put in Speech by Language (**most of times German**)

$(u(t), g(t)) \rightarrow \frac{h'(T)}{g'(T)}$, with $T \in [a;b]$, $f : (u(t), g(t)) \rightarrow \mathbb{R}$, f twice differentiable on $[a;b]$, with

$$Error = f(x) - [f(a) + f'(a)(x-a)] - \frac{f''(X)}{2}(x-a)^2, \qquad X \in [a;x] \subset [a;b]$$

If $x \lll b$ then you hope.

First Phase of Work with Equilibrium C_2 -a perfect Circle $r = 1$.

(Choose first phase C_1 a Cardioid as $x^1(t)$ such that $\exists u^1(t)$). Here $C_1 - C_2 > 0$. The Cardioid $r = 1 + \sin\dot{\vartheta}$. 1+sin$\vartheta = 1$, let us $\vartheta = \pi$ or 0. The area is $\frac{1}{2}\int_0^{\pi}\left[(1+\sin\vartheta)^2 - 1\right]d\vartheta = 2 + \frac{\pi}{4}$. The Phase is $\frac{1}{2}\int_0^{x}\left((1+\sin\vartheta)^2 - 1\right)d\vartheta = f(x) = f(x^1(t))$.

To chain Phase $x^1(t) = 4\pi t^2$ after Phase $x^2(t) = \frac{4}{3}\pi t^3$ lets us believe that $x^1 > x^2$ for $t \in [1;3]$, and $x^1 < x^2$, $t \in [3;\infty]$. The 3 units are: Forum>Dialog>Ausgleich (Compensation)

Phases without Commands and Relaxation of Phases.

$x^i(t) : \vartheta_i \rightarrow \varphi_j = x^j(t)$. It is flat rate (forfait) for agréement $\rightarrow \exists A^{adj} : v^i \rightarrow x^i$ if $A : x^i \rightarrow v^i$. $x^j = \begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos\varphi & -\sin\vartheta \\ \sin\varphi & \cos\varphi \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = x^{j+1}$, a rotation of φ. If $\varphi = 45^0$ then $A^{adj} = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{bmatrix} : \varphi^j \rightarrow \vartheta^j$, where $x^j \rightarrow x^{j+1}$. The syndicate description is $(\sin x \rightarrow \frac{\partial \sin x}{\partial x}) \rightarrow (\cos x \rightarrow \frac{\partial \cos x}{\partial x}\dot{)}$. To Relax the Phases we have a procedure $O(n)$ in $x_k^* = \begin{bmatrix} x_1^k & x_2^k & \ldots & x_n^k \end{bmatrix}$ with $x_i^k \pm 1$.

Success and Pleasure in front of all Prices.

The Clepsydra lets us: $\left(\frac{\partial y}{\partial x}\right)^2 - \frac{2y}{x}\frac{\partial y}{\partial x} = 1$. With $y = \varphi(x)$, with two solutions $\varphi_1(x) = Ax^2 - \frac{1}{4A}$ as Cluj→Cluj and $\varphi_2(x) = \frac{A}{2}x^2 - \frac{1}{2A}$ from Cluj→Euro. The price is $p(x,t) \rightarrow p(x)$ a feature for no norm and at a good place. We have $\frac{\partial}{\partial x}(xp(x)) = p(x) + x\frac{\partial p(x)}{\partial x}$. Once we have the Price $p(x)$, we wonder about what the x is. For the two areas we know that: we have a pool of 2(areas)•$(2 \cdot 3 \cdot 4) = 2(4!) = 48$ for φ_1 and φ_2 with $4! = 24$ people by area φ_1 and φ_2. These areas being adjoint, we have exponential growth with small exponent, as $\exp(-0.02)$. As per area we have $5 \geq 4$ with $4!$, $\frac{\partial p(x)}{\partial x} = -5\exp(-0.02x) \approx -5$ at $x = 1$. (they are adjoint areas) The Price does not decrease or increase. We know $\frac{\partial p(x)}{\partial x} \approx -5$ the publicity campain. Therefore $p(x) = 0.1e^{-0.02x}$, as from $0.1 = -5(-0.02)$. So: $\frac{\partial}{\partial x}(xp(x)) = 0.1e^{-0.02x} - 5xe^{-0.02x} = (0.1 - 5x)e^{-0.02x} = 0$. The solution is: $x = \frac{2}{100}$ the effort x of involvement for the price of $\frac{1}{10}$. We know $\frac{1}{10} \cdot \frac{2}{100} = \frac{2}{1000}$ meaning the constant distance in between φ_1 and φ_2 It is clear that there is exponential growth in adjoint areas, where the publicity from .φ_1 to φ_2 is with default 5.

Limits of Inversion.

The continuity of $f_n \rightarrow f_\infty \in A$ metric Space is not preserved by limit, but ends at f_N. We know about uniform convergence of $f_n(x) \rightarrow f_\infty(x)$, $\forall x \in E$ closed in a metric Space. It imlies point conversion at $x \in E$ ($\forall x \in E$, (we only need some points). For E we know as Justice, Anomymat, article de presse and letter, Stammfunkions and Extremity of Market to exist. If f is bijective and continous on Compact $M_1 \to M_2$ then f^{-1} is also continous, here M are metric spaces. An example: $f(x) = \sqrt{x}$ continous on $[0;\theta)$ invertible to $f^{-1}(x) = x^2$ on $[0;N] \subset \mathbb{R}$.

About the norm and to avoid it: the Metric Space $\lceil M, \rho \rceil$ has $\rho(x,x) = 0, \rho(x,y) > 0, \rho(x,y) = \rho(y,x), \rho(x,y) \le \rho(x,z) + \rho(z,y)$, a Totaly Bounded Set $A \subset M$, as $\exists L$ such that $\rho(x,y) \le L,\ \forall x,y \in A$ (given $\epsilon > 0, \exists A_1, A_2, .., A_n \subset M$ such that $diam(A_k) \le \epsilon$, $k = 1, .., n$ and $A = \bigcup_{k=1}^{n} A_k$. A Complete Set has all Cauchy sequences converging to a point: $|S_n - S_{n+1}| < \epsilon$, $\forall n \ge N$. A Compact Space is a Metric Space, that is complete and totaly bounded.

Monotonicity.

$\exists f$ on $[a;b]$, $\exists f'$ on $[a;b] \ne 0$ on $[a;b]$ $\to$Monontone (Shape Principle to sketch Graph.

Critical Points.

$\exists\ x \in [a;b]$ such that $f'(x) = 0$, then x is possibly not defined. You may test $f'(x)$ of different sign on t_0 & $t_1 \in [t_0, t_1] \to \exists f = 0$, at $t \in [t_0, t_1]$. Concavity is defined as $f''(x) > 0$ on $x \in [a;b]$ and $f''(x) \ne 0$ on $[a;b]$, We know that $\exists f'(x)$ that is monotone to have simple concavity in presence of f''.

At $x \in [a;b]$ such that $f'(x) = 0$, then x is possibly not defined and knowing $\exists \varphi(y) = x$ and $\exists f(x) = y$ with $\varphi'(y) \ne 0$, then for this x, we have

$$f'(x) = \frac{1}{\varphi'(y)}.$$

We know $\int_1^x \frac{1}{t} dt = \ln(x)$.

Singular Points.

as f or f' is not defined at $f(x)$ and $f'(x)$ on $x \in [a;b]$. (There are fractional (as $x^{\frac{1}{3}}$) and divided ($\frac{1}{x^2}$) polynomials). If $f(x)$ is not defined (not only $f'(x)$) then it is not critical, but singular. If f is continuous and has no critical points on $[a;b]$ then it is monotone. (The Shape Principle)

Smooth Functions and Paths.

Path: $(x,y) \to (g(t), h(t))$, $h(t)$ is smooth if $\exists g'$ and h' continuous and never simultaneously zero.

Function: f is smooth if there are Riemannian Step Functions leading at limit to continuously differentiable function.

Determining Boundary. The Ranch with the Fence of 1 Mile.

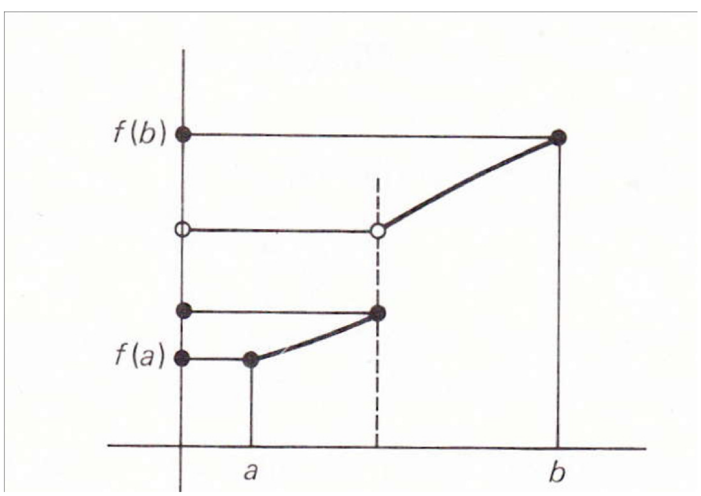
There is a straight River and the Fence is in a rectangular area, where one side is the river. For 3 sides we have a length of $\frac{1}{3}$ area of $\frac{1}{9}$. As the length perpendicular of the river is 1 $mile - 2x$, the area is $x(1-2x)$ where $x \in \left[0; \frac{1}{2}\right]$. This parabola has a maximum. We have $\frac{\partial A}{\partial x} = 1 - 4x$, this quantity is 0 if $x = \frac{1}{4}$, and $A_{\frac{1}{4}} = x - 2x^2 \ |_{x=\frac{1}{4}} = \frac{1}{4} - \frac{1}{8} = \frac{1}{8}$ square miles. $\exists A(x)$ and if $\exists y = x - 2x^2 \to$ max we know that if $\exists x_0 \to x_0$ at $\max A(x)$ then $y(x)$ is max at x_0. There, f is continuos and we assume a maximum. If there are critical points x_i, $\exists \max x_i = M$, and M is max with $x_i \in [a;b]$. At this $M, f'(x) \geq 0,$ or $f(,(x) \leq 0, \Rightarrow \exists f'(x) = 0$ and $f''(M) \leq 0$ as $f(x)$ is continuos on $[a;b]$. Quadrature of the Circle.

Work and Related Rates. Function composition.
$y = f(x)$, and $x = g(t) \Rightarrow y = f(g(t))$, and $\frac{\partial y}{\partial t} = \frac{\partial y}{\partial x}\frac{\partial x}{\partial t} = f'(x)\frac{\partial x}{\partial t}$.

Discontinuities at Work.
The expanding Circle in Pond: The radius r grows at 2feet/sec when $r = 5$. How fast does the Circle C expand in Pond ? $A_C = \pi r^2$ varying with r, which varies by t. $\frac{\partial A}{\partial t} = 2\pi r\frac{\partial r}{\partial t}$, $\frac{\partial r}{\partial t} \mid_{r=5}$, $\frac{\partial A}{\partial t} = 2\pi r\frac{\partial r}{\partial t} \mid_{r=5} = 2\pi \bullet 5 \bullet 2 = 20\pi = 63$ square miles. The Discontinuity definition is: $f \in C[a]$ if $(x \to a) \Rightarrow (f(x) \to f(a))$. If $p(x)$ and $g(x) \in C[a;b]$ and are polynomials, then $\frac{p(x)}{g(x)} \in C[a;b]$.

Discontinuity as Work.
On axis Ox we have $a_1, a_2, \ldots$ jump discontinuities but $\exists \lim_{x \to \tau-} f(x) = a_i$. There is a Jump and *left* side continuity. This is the first species of continuity. an other example is: $x = \lfloor x \rfloor$ an approximation to the previous natural (stamps in letters as an example) -a reversed step function with *right* side continuity. By continuity we know there are $\lim_{(x \to c_-)}[f(x)] = f(c)$, and $\lim_{(x \to c_+)}[f(x)] = f(c)$ and they are equal. If it is discontinuous these are not equal, one of them or both do not exist, or all are different ($\lim_{(x \to c_-)}[f(x)] = f(c)$, and $\lim_{(x \to c_+)}[f(x)] = f(c)$ and $\lim_{(x \to c)}[f(x)] = f(c)$). We define a Jump Discontinuity: There are: $\lim_{(x \to c_-)}[f(x)] = f(c)$, and $\lim_{(x \to c_+)}[f(x)] = f(c)$ and $\lim_{(x \to c)}[f(x)] = f(c)$ and are not equal then we have this Jump.

Majoration and Right Continuity of an increasing Function.



We have $\lim_{(x \to c)}[f(x)] = f(c)$, and $\lim_{(x \to c+)}[f(x)] = f(c)$ does not exist (as in previous picture). We say the values of $f(x)$ steadily increase and $\lim_{(x \to c)}[f(x)] \leq f(c)$ as majoration. Benefits of majoration: (1) $f \uparrow$on I and is discontinuous at point $c \in I$ then that discontinuity at c is a Jump discontinuity. (oscillations of polynomials and other oscillations), (2) $f \uparrow$ on I

and Range(f)$\equiv J \subset \mathbb{R}$ then $f \in C[J]$. (3) $f \in C[I]$, $K \in [f(a), f(b)] \rightarrow \exists x \in I$ such that $f(X) = \dot{K}$ (recall the Proof as: $\frac{f(b)-f(a)}{b-a} = m$ slope of $f'(X)$). The Mean value Theorem is $f(b) - f(a) = f'(X)(b-a)$. A boundary value test is $f(b) - f(a) \leq (b-a)$ or $f(b) - f(a) \geq (b-a)$ with both side discontinuities in study. The Statement of Rollé is: $f \in C[a;b]$, f differentiable on $[a;b]$, and $f(a) = f(b)$, then $\exists X \in [a;b]$ such that $f'(X) = 0$. (4) a good majoration on $f(x) \in C[a;b]$ as a small change in x lead to small change in $f(x)$. Recall that: We have $\lim_{(x \to c)}[f(x)] = f(c)$, and $\lim_{(x \to c_+)}[f(x)] = f(c)$ does not exist. We say the values of $f(x)$ steadily increase and $\lim_{(x \to c)}[f(x)] \leq f(c)$ as majoration. Sometimes $f(a)$ is of different sign of $f(b)$, then there is a $c \in [a;b]$ such that $f(c) \neq 0$.

Securities and Bonds at Work.

Securities are left continuous at discontinuity of $f(x)$, $x \in [a;b]$.

Bonds have both side continuities.

The Expected return of Securities are $\left[\sum_{i=1}^{n} \lambda_i v_i\right]_{\lambda_1+\lambda_2+..+\lambda_n=1}$ where v_i are vertices of polyhedrons. If the volume of the polyhedron is big, we may insert Bonds in portfolio. Many adopt Bonds easily, and Securities should be at the boundary of the polyhedron.

Smoothness Hypotheses.

Differentiability is known as with Strong Smoothness Hypotheses. Smooth requirements come from another field than mathematics. Non-smooth Analysis and Geometry is in Optimization. We know these hypotheses as: from differentiable properties of non differentiable functions, and know there is a Non Smooth Analysis and a clear Definition of Smoothness.

Non Smooth Analysis is with $\exists (x_i, y_i) \in \mathbb{R}^2$, $\exists h_\vartheta = \vartheta(x_i) = y_i$ a line of regression, and $\exists$ a Polyhedron of (x_i, y_i) with norm $\rho_C(x_k, y_k) = \min_{\forall k \text{ we have } (x_k, y_k)} |c - (x_k, y_k)|$. This is an analytical expression of vertices.