Health Equilibria as Continuous Time Experiment Computation.
The case of Health.

Life-Style.

The definition of Life-Style is through a Markov Chain $M^{k=1,\ldots,n}$ for n days.

As time goes: $t \in [t_0, t_1, .., t_n]$, we have $f : t_k \to \alpha \in \mathbb{R}$, called change.

For chronic diseases you have $t_k \in [t_0, t_1, .., t_n]$, t_k called Onset.

Equilibria is defined: as existence of $k + l$ and $k + l + q \leq n$. (namely you do not die). The quantity l is called uniqueness and finding Equlibria is by adding q. The Equalibria may be studied by Paretto's Optimality. The interaction of organs leads to movement in humoral environnement and will of regeneration. The effects of longevity is in the pulmonary membranes and gastrointestinal tract. The hormaonal Therapy is in front of Tissue Decline and Protein assimilation. The Food Ration with Protides is to compensate is with Nitrogen depletion and Senescence.

There are 6 main diseases, that order are called a set for **Aerobic Capacity**.

As such: Cardiovasculary, Diabète, Obesity, Arthritis, Osteoporosis, Hypertension.

The intervention comes from: Kinesiology (tension and pulse), Psychology (anxiety, sleep, time, life-style), Dietitian (monbilansante.com). There are free classes at the Y to manage weight.

Risk.

$f : t_k \to \alpha \in \mathbb{R}$ is called change. Also $g : \alpha \to e^\alpha$ growing fast and is a Risk as $\frac{1}{f \circ g(\alpha)} \in [0; 1]$. Also g is called *facteur de risque.*

Determinant Risk Factors. (heart Conditions and Sex, Family antecedents and improved cardiac condition at age less than 55)

Nondetermined Risks are as Exercise: Cholesterol, Diabetes, Hypertension, Sedentarity, Enbonpoint, Osteoporosis.

We cannot speak during the exercise, and one has to lower the effort. He also has to be conscious of the progress of exercise. Rechauffement and Cooling at exercise are also factors.

Statement of Problem.

The Outcome of Event $\frac{1}{f \circ g(\alpha)} \in [0; 1]$ and we want to determine experiment. From disease $h : t_k \to [k, k + 1, \ldots, n]$ we have dependencies $d(y_k) = h \circ f : t_k \to k$, determining disease y_k. Clearly y_k is not a set of dependent events (diseases). We assume occurrence of y_l having no relation to occurrence of y_m. There are 6 experiments (diseases). from k to n, for each disease we have independent experiments. They would be composite if not independent.

Operation and Independence.

In the suite $[k, k + 1, \ldots, n]$, we have for some y_k and y_{k+j} a common occurrence from both and from $k + j$ in row to n. We know $f : t_k \to \alpha \in \mathbb{R}$ as a random experiment where t_k is associated with chronic diseases. There is a bigger set of diseases. We may have pairwise dependence or independence with $\{y_1 y_2, .., y_6\}$ also called inspection. About this relationship we say: there are continuous time experiments, but this relationship is incomplete.

No Completeness Assumptions.

There is advantage if we could find an Agent. Set Bonus Malus and find Backward Equations. This equation defines a structure. But the situation has no structure: as we have Agents and Symptoms, we are in presence of backward loops. The Equilibria and the Bonus Malus Consumption are binded by the following steps as seen in the Bonus Malus Document: **The calculation template is in 3 steps**:

(1) called Treatment Effects $Z \to X$ or simply effects at Sample of Association.

$$\left\| \begin{array}{cccccc} \ldots & \ldots & X = x & U = u & \Pr(U = u) & \ldots \\ Y = y_1 & \ldots & \ldots & \ldots & \ldots & \ldots \\ \Pr(Y = y_1 \mid X - x, U = u) & & & & & \Pr(Y = y_1 \mid X - x, U = u) \end{array} \right\|$$

(2)

$$\Pr(Y = y, X = x \mid Z = z)$$

$$= \sum_{\forall n} [\Pr(Y = y \mid X = x, U = u) \cdot \Pr(X = x \mid Z = z, U = u) \cdot \Pr(U = u)]$$

called Backward Propagation as an example to be solved (see picture above).

(3) The objective $X \to Y$, from Treatment received to an observed response is by calculation of a given treatment effects to the observed response.

$$\Pr(Y = y, X = x, U = u)$$

$$= \Pr(Y = y \mid X = x, U = u) \cdot \Pr(X = x \mid Z = z, U = u) \cdot \Pr(Z = z) \cdot \Pr(U = u)$$

as dependencies from picture, also called joined distribution as decomposition. We know that $\Pr(U = u)$ cannot be observed as Past is not smooth.

Clearly we could call the Backward Propagation $Y \to X \to Z$ and have:

$$\Pr(Y = y, X = x \mid Z = z) =$$

$$= \sum_{\forall n} [\Pr(Y = y \mid X = x, U = u) \cdot \Pr(X = x \mid Z = z, U = u) \cdot \Pr(U = u)]$$

End of the 3 Steps.

Clearly Symptom→Agent is a forward equilibrium, in front of a wrong metabolism (Sodium, Sugar,...) and will of detoxification, blood numbers and exercise. The Agent $A \in X = \mathbb{R}^d_+$ iterates as $i = 1, 2, ..d.$ to $e^i \in X'$. Here e^i is a polyhedron where vertices $v_{i=1,..,k} \in X'$. As such, a convex combination of $v_{i=1,..,k} \in X'$ defines $\forall i, e^i \in X'$.

The Law of Motion (intervention) is where $X = \{x \mid \langle p, x \rangle \leq \langle p, e^i \rangle\}$. As $X' \subset \{v_{i=1,..,k}\}$, we call it a Budget Set. X' is a complete Space: namely, metric and every

Cauchy sequence of points of X' convergences to X. The Cauchy sequence is such as convergent in as much as also s_n is close to s_{n+1}. (these s_n are called partial sums).

We define demand a_{ij} a link from x_i and x_j where we find a relation in between what the Agent sees in condition i and j. (for two diseases i and j). We want

$$\sum_{j=1}^{r} \| a_{ij} \| = \sum_{j=1}^{r} |e^j|$$

and call this equality one of Offer and Demand. The majoration of $\langle p, e^i \rangle$ is done by the Heilpraktiker and p is the price. Equlibria is defined as existence of $k + l$ and $k + l + q \leq n$, and finding q is a regulation. To find a regulation, you travel from p_0 to p_1 and p_2, and from each $p_1$or p_2 to $p_{\cdot j}$ where p_1 or p_2 are related to $\langle p_1, e^i \rangle$ or $\langle p_2, e^i \rangle$. These $\langle p_m, e^i \rangle$ are called dividends and belong to the Budget Set $\{v_{i=1,..,k}\}$. We recognize p_1 or p_2 as a travel from p_0 and $\langle p_1, e^i \rangle$ or $\langle p_2, e^i \rangle$ are leafs and dividends. There are max j leafs, recognized from each $p_1$or p_2 to $p_{\cdot j}$, and $p_{\cdot \min j} = p_3$, and so on. The step from dividends to prices is a sale in intervention, also called majoration. For a single price in the dividends, we have the following terminology: short lived securities (discrete in time). The objective of the Agent is to have a continuous time in regard to all of the body. In the Budget $\langle p, x \rangle \leq \langle p, e^i \rangle$ relating to $X = \{x \mid \langle p, x \rangle \leq \langle p, e^i \rangle\}$ and $X' \subset \{v_{i=1,..,k}\}$ the polyhedron, is a law and are Big Data. If you have $v_i \approx e^i$ and you take the median you are **immune**. At this point you know that you do not evaluate a hypothesis , and that it fails to generalize when you need a train test. From the Law of Motion to the Agent above we are in front of a Self Determination Method.

A well posed Problem is the use of Agents: the Agent is Human as a Heilpraktiker or Programmer from ambiguity and to estimation. In Equilibria we have the stochastic differential equation: $\partial Y_t = -f(t, w, Y_t, Z_t)\partial t + Z_t \partial W_t$, where $Z_t \partial W_t$ is a Brownian Motion. $Y_t = \xi, Z \in \mathbb{R}^{n \times d}, W \in \mathbb{R}^d$. The solution $Y \in \mathbb{R}^n$ is the Equilibria. This is an exercise of Statistics (Stochastic). The Agent $A \in X = \mathbb{R}^d_+$ iterates as $i = 1, 2, ..d.$ to $e^i \in X'$. Here e^i is a polyhedron where vertices $v_{i=1,..,k} \in X'$. As such, a convex combination of $v_{i=1,..,k} \in X'$ defines $\forall i, e^i \in X'$. You need Data and a Programme. It is well to consider monotonicity, namely in sequence of data $a_s \geq a_{s+1}$ or $a_s \leq a_{s+1}$ happen. Also ordinating a_i. From Data and Programme you may predict Ageing. In front of incomplete Equilibria you cannot find a new Agent g_{k+1}. The Agents are known as a Set G, with $G = \left\{ [g_i] \mid g_i = V_i \text{ a random variable where } g_i : C(1, T) \to \mathbb{R} \right\}$. The composite experiment of many V_i in a row and all independent in regard to Outcome may be a sum $\sum_{i=1}^{T} V_1 = \Pr(v_i \leq T)$ also called the Binomial Probability Distribution.

Vermutlich ein kollektiver Anfall wilder Entschlossenheit generierte in uns plötzlich die Überzeugung, eine Einschtigshilfe in (bereits anderweitig bewährter) Light-Technologie könne diesen Zustand fortan beenden, und wir seien die Auserwählten, dieses in einer Rekordzeit von Monaten zu verwirklichen. Primäre Zielsetzung: So produkt-unabhängig und parxisorientirt wie möglich einem neuen Benutzer den Zugang zum Komplex Program ermöglichen.

Hessians and the Heilpraktiker.

If $f : \mathbb{R}^n \to \mathbb{R}^m$, we define the Hessian as a $m \times n$ function in relation to f (written as ∇f) evaluated at a point $x \in \mathbb{R}^n$ as a multi dimensional mapping from $\nabla f(x) : n \to m$, and

$\nabla f(x) = \left[\frac{\partial f_i}{\partial x_j} \right]_x$ where i runs through 1 to m and j from 1 to n. As an example:

$f : x_i \to \begin{bmatrix} x_1^2 + x_2 + x_1 x_3 + 1 \\ x_1 - x_2^2 - x_1 x_2^2 \\ x_2 + x_3^5 + x_4 \end{bmatrix}$ where $f(x_i)$ are fitting

Curves.$\nabla \begin{bmatrix} x_1^2 + x_2 + x_1 x_3 + 1 \\ x_1 - x_2^2 - x_1 x_2^2 \\ x_2 + x_3^5 + x_4 \end{bmatrix} = \begin{bmatrix} 2x_1 + x_3 & 1 & x_1 & 0 \\ 1 - x_2^2 & -2x_2 - 2x_1 x_2 & 0 & 0 \\ 0 & 1 & & 1 \end{bmatrix}$. Here

$\nabla f(x) \mid_{x=0} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$. At that point we determine Early Senescence.It is known that Convexity is iff as $f(x) \geq f(y) + \nabla f(y)(x - y), \ \forall x, y$. We see this as for given $x = u$ chosen, then $f(x) \geq f(u) + \nabla f(u)(x - u)$ and $f(y) \geq f(u) + \nabla f(u)(y - u)$ where $u = \lambda x + (1 - \lambda) f(y) = u$. By multiplying $f(x) \geq f(u) + \nabla f(u)(x - u)$ and $f(y) \geq f(u) + \nabla f(u)(y - u)$ we have $\lambda f(x) + (1 - \lambda) f(y) \geq f(u)$, meaning convex.

There is further differentiability: $\nabla \nabla f(x) \circ h \circ k = \begin{bmatrix} \langle h, H_{f_1} k \rangle \\ \langle h, H_{f_2} k \rangle \\ \langle h, H_{f_m} k \rangle \end{bmatrix}$ where

$\begin{bmatrix} \frac{\partial^2 f_i(x)}{\partial x_1^2} & .. & \frac{\partial^2 f_1(x)}{\partial x_1 \partial x_n} .. \\ .. & .. & .. \\ . \frac{\partial^2 f_1(x)}{\partial x_n \partial x_1} . & .. & \frac{\partial^2 f_i(x)}{\partial x_n^2} \end{bmatrix} = H_{f_i}(x)$ properly defined as Hessian.