Covid 19 Seen by Differential Equations:Model I (Covid 19 Vu par des Equations Différentielles: Modèle I)

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- We denote by $N(t)$ the number of healthy persons, persons who aren't infected at time t.
- The number of infected persons at time t is given by the expression

$$\int_{t-T}^{t} f(N(s))ds$$

where T is the incubation period, The scientific health staff talks about of 14 days for COVID19 and f can be get from the data on the field.

- From the assumptions formulated above the model can be written under the form:

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- comment: To be infected one has to undergo an incubation period and the number of infected person is given by

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Which can be written as

$$\dot{N}(t) = F(N(t), N(t - T)) \tag{3}$$

- The equation (3) is called a delay differential equation, or diifferential equation with delay.

(L'equation(3) est dite equation differentielle à retard)

- As said in the previous lectures if the delay T is zero, we recover an ordinary differential equation. So delay differential equations are more general then ordinary one, in mathematical language ordinay differential equations are a subset of delay differential equations.

(Comme dit dans les conférences précédentes si le retard T est nul, on récupère une équation différentielle ordinaire. Les équations différentielles à retard sont donc plus générales que les équations ordinaires, en langage mathématique, les équations différentielles ordinaires sont un sous-ensemble des équations différentielles à retard.)

- Since differential equations with delay include ordinary ones, can we generalize the results established for ordinary differential equations to those with delay?

(Comme les equations differentielles avec retard englobent celles ordinaire , peut-on generaliser les resultats etablis pour les equations differentielles ordinaires à celles avec retard ?)

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  4- How can we define an equilibrium of the equation(3)?
  5- How can we iterate the equation (3)?
  6- You can imagine other questions.
  7- First of, for each question take an example and try to do as it is done for ordinary differential equation and note the difficulties

Cela semble être une question globale, nous essayons donc de poser des questions précises.

1- Le problème de Cauchy: comment définir un problème de Cauchy? pause

2- Une fois le problème de cauchy défini peut-on obtenir le même problème de cauchy pour les equations différentielles ordinaires si on prend le délai nul? pause

3- L'existence et l'unicité: quel est le minimum d'hypothèses pour obtenir d'abord l'existence et ensuite l'unicité? pause

4- Comment définir un équilibre de l'équation eqref e: 3? pause

5- Comment pouvons-nous intégrer l'équation eqref e: 3? pause

6- ous pouvez imaginer d'autres questionsous pouvez imaginer d'autres questions

7- Tout d'abord, pour chaque question, prenez un exemple et essayez de

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- Veuillez rester en bonne santé.

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