Du
17
JAN.
2022
au
26
MARS.
2022

10h00
-
12h00

2022-T1 MATHEMATICAL MODELING OF ORGANIZATION IN LIVING MATTER

Course: Mathematical Epidemiology of Infectious Diseases (O. Diekmann, L. Almeida), ~~on Mondays 10h-12h~~

INSCRIPTION

This will be a blackboard course.

If you have questions about this course, please send a mail to

O.Diekmann @t uu.nl and luis.almeida @t sorbonne-universite.fr

Topics :

The course will concentrate on

- the formulation of mathematical models of the spread of an infectious disease in a host population;
- the analysis of such models;
- the derivation of epidemiological insights by interpretation of the results of the analysis.

The course focusses on deterministic population level models, but with due attention for the underlying stochastic processes at the individual level. From a mathematical point of view, the emphasis is on Renewal Equations, a certain kind of delay equations. There will be some, but not much, attention for data analysis and control efforts.

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A preliminary list of topics is

1. Epidemic outbreak in a demographically closed population (or: what is the celebrated 1927 paper of Kermack & McKendrick all about ? Not (just) about the SIR and SEIR compartmental models !)
2. Heterogeneity : the next-generation matrix/operator, the basic reproduction number (Perron- Frobenius, Krein-Rutman), the Malthusian parameter and the final size equation
3. Compartmental models
4. Including demographic turnover : age structure
5. Spatial Spread
6. Waning Immunity
7. Dangerous Connections: on binding sites models

Literature :

O. Diekmann, J.A.P. Heesterbeek, T. Britton, Mathematical Tools for Understanding Infectious Disease Dynamics, Princeton University Press, 2013

Back to main page

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HORAIRES

L'institut :
• lundi au vendredi de 8h30 à 18h,
• fermé les jours fériés.

Le musée - Maison Poincaré :
• lundi, mardi, jeudi et vendredi
de 9h30 à 17h30,
• samedi de 10h à 18h,
• fermé le mercredi et le dimanche.

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