

Sequence 3 : Modelling risk and time

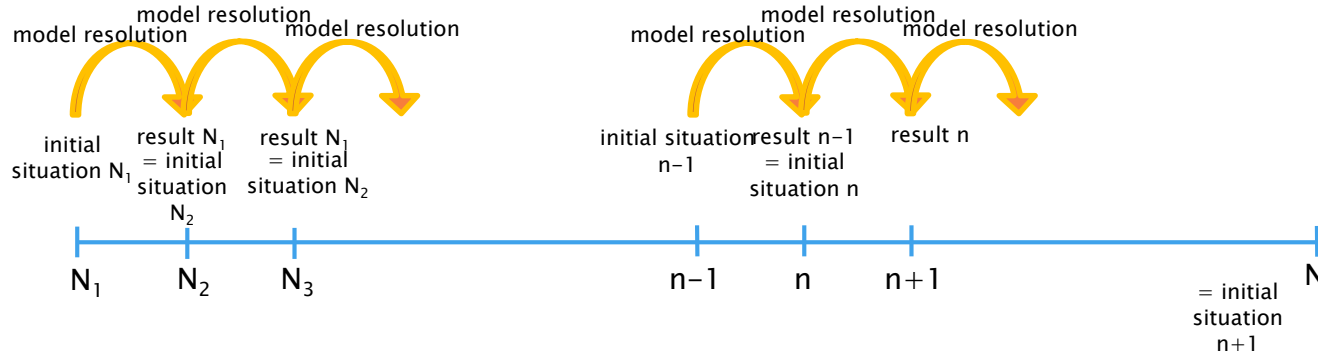
Unit 3 : Modelling time

Lesson 28 : Recursivity in dynamic models

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ModelEco

Recursivity



Initial conditions on for example:
available surface, initial rotation, number of animals

Rotation constraints

- ▶ Different yields or costs according to previous crop
- ▶ Impossibility to succeed one another for certain crops (work schedule)
 - ▶ **The previous crop has an effect on the choice of the crop of the current year**

Crop successions

P : set of previous crop

- ▶ The area dedicated to C for year t cannot exceed the area dedicated to its previous crops for year t-1
- ▶ Definitions :
 - $X_{c,p}$ with X the area dedicated to crop C with previous crop P
 - $\sum_p X_{c,p}$ the total area dedicated to crop C
 - $\sum_c X_{c,p}$ the total area of crops with a previous crop P

Influence of the previous crop on crop yields

Ex :

- $X_INIT_p \geq \sum_c X_{c,p}, \forall \text{ crop } C$

With X_INIT Initial cropping pattern : previous crops

- ▶ Use the data from the Centre–Val de Loire model in the rotation lesson activities.
- ▶ Reminder :
 - 6 crops
 - Data per crop : yield, price, costs, irrigation needs
 - availability : land (110 ha) and water (60 000m³)

In GAMS, add :

- a new set P identical to C for the previous crops
- an initial crop pattern parameter
- yields according to C and P
- a crop pattern variable according to C and P
- a rotation constraint which takes into account the previous crops
- a loop which makes it possible to solve the problem over a large number of years

It's your turn now !
Solution in the next video !