

Soutenance de stage de fin d'étude

Achille BAUCHER

March 8, 2022



Contexte



Contexte

Institutions



Plan

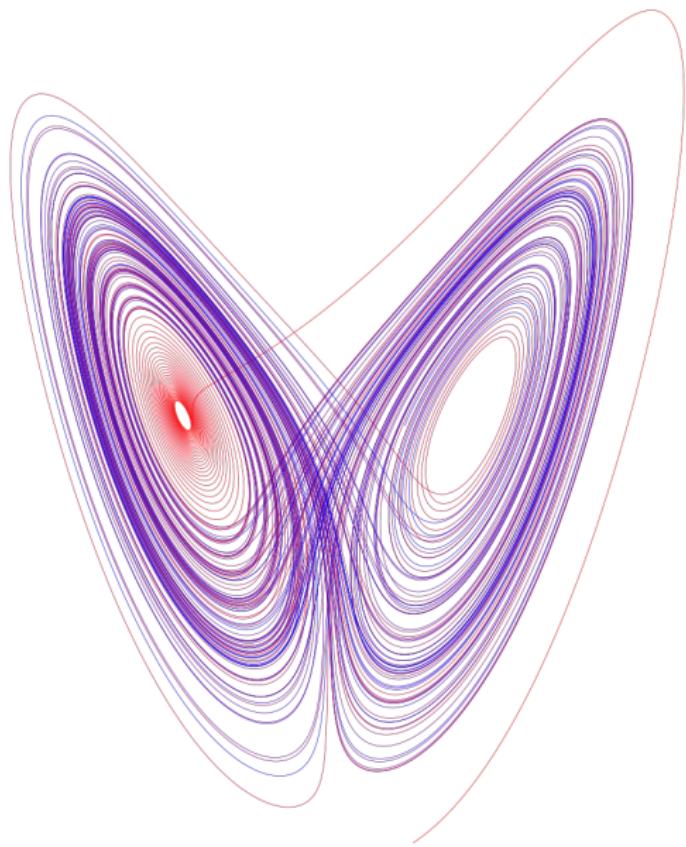
Apprentissage de dynamiques

World3

Pydynamo

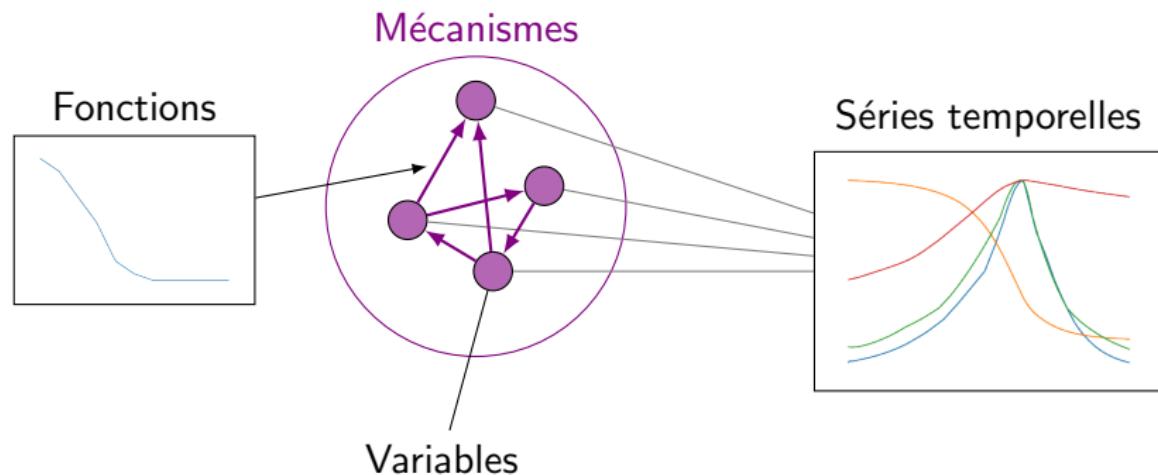
La recherche scientifique

Apprentissage de dynamiques



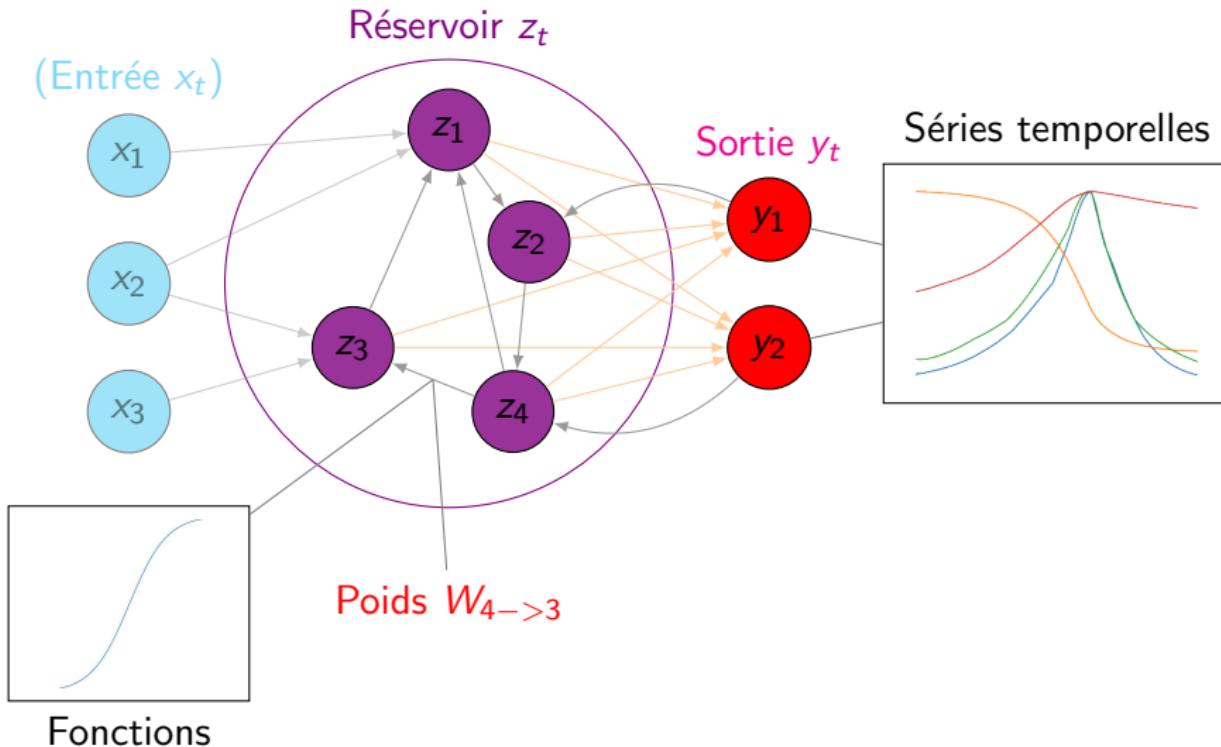
Apprentissage de dynamiques

Système dynamique



Apprentissage de dynamiques

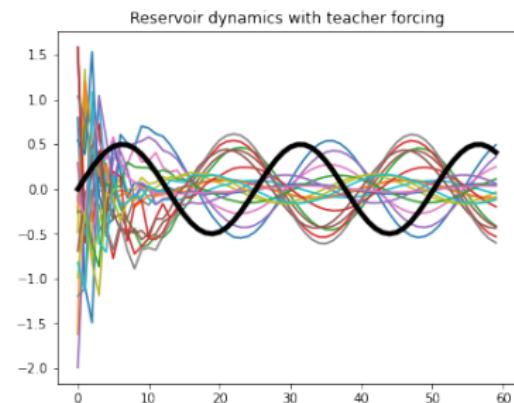
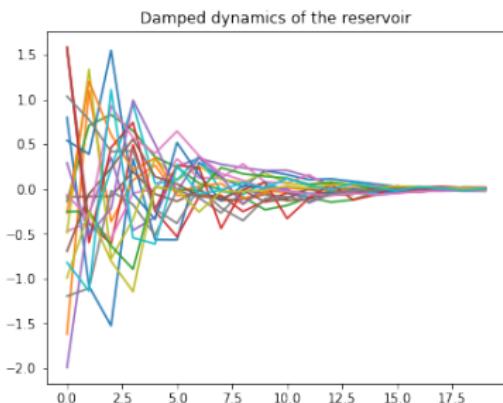
Echo State Network



Fonctions

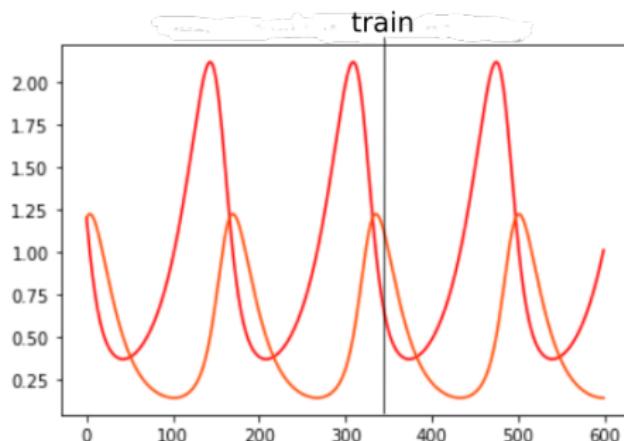
Apprentissage de dynamiques

L'écho et le professeur

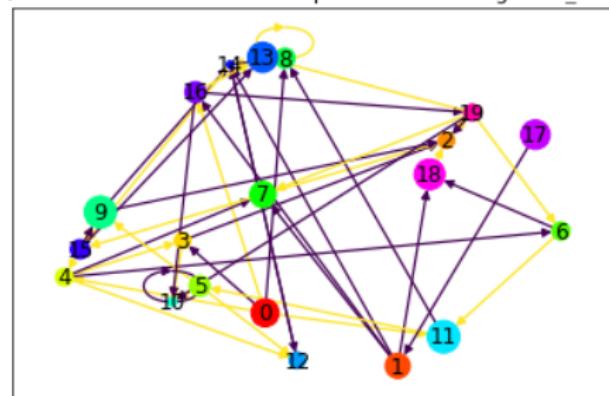


Apprentissage de dynamiques

Dissection du réseau

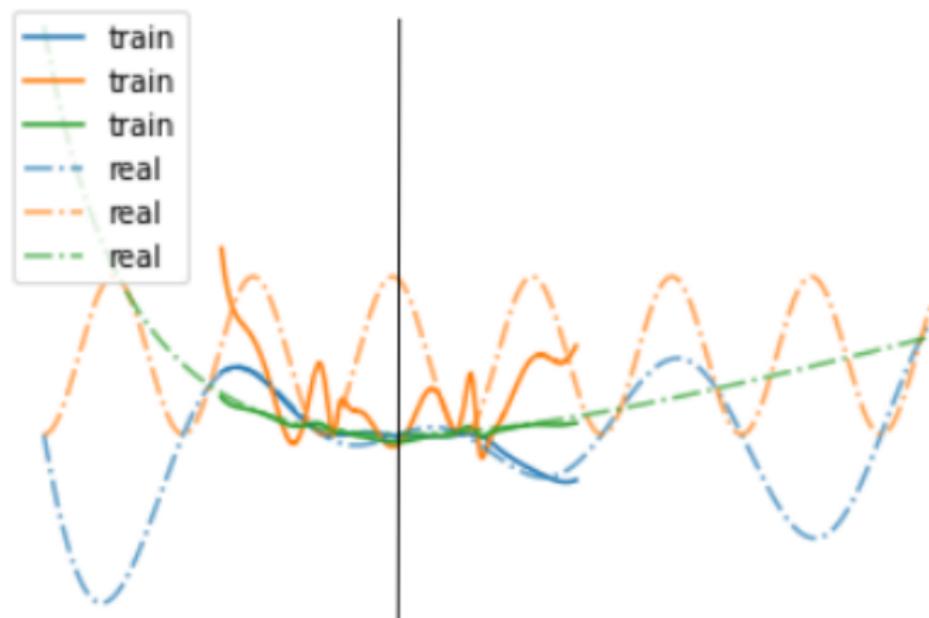


Graph representation of internal states
(node size is their mean importance according to W_{out})



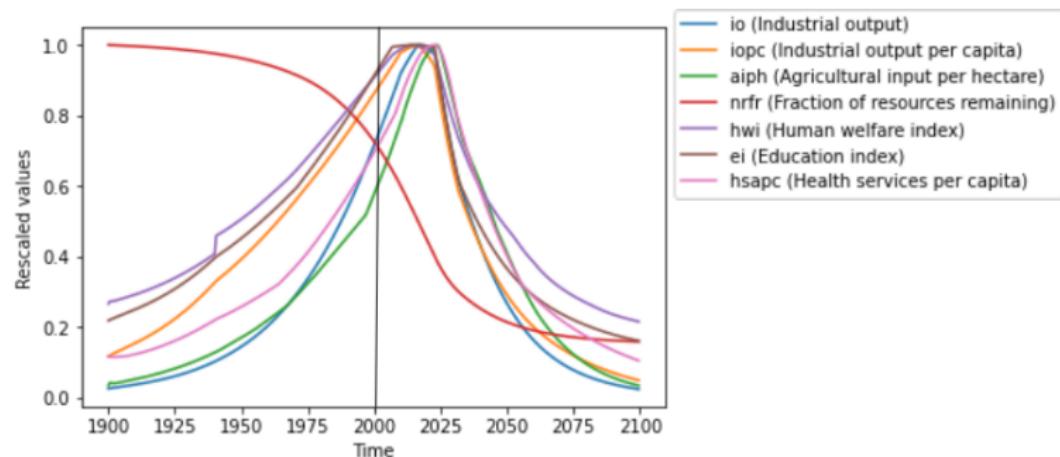
Apprentissage de dynamiques

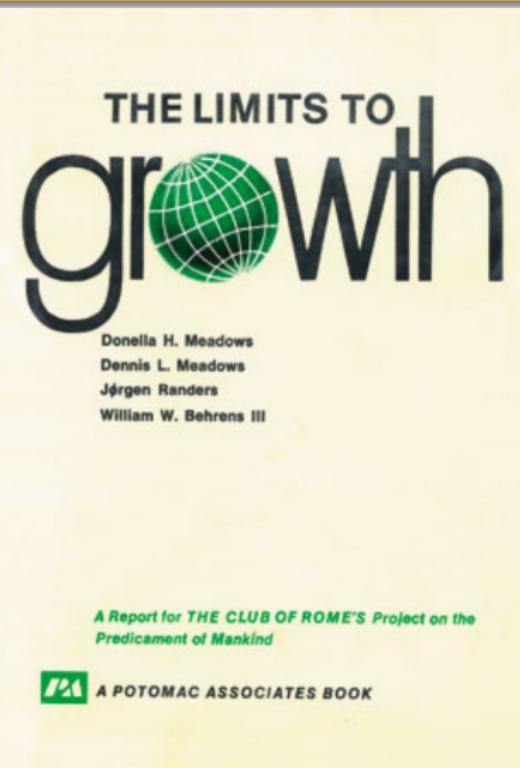
Approximation universelle



Apprentissage de dynamiques

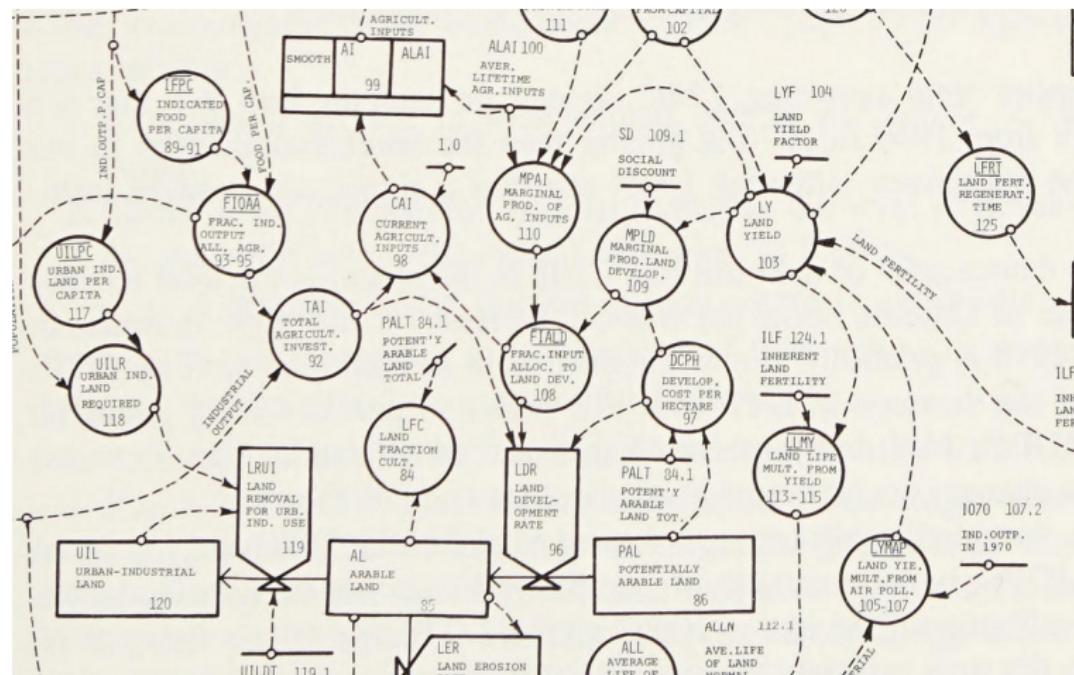
Limites





World3

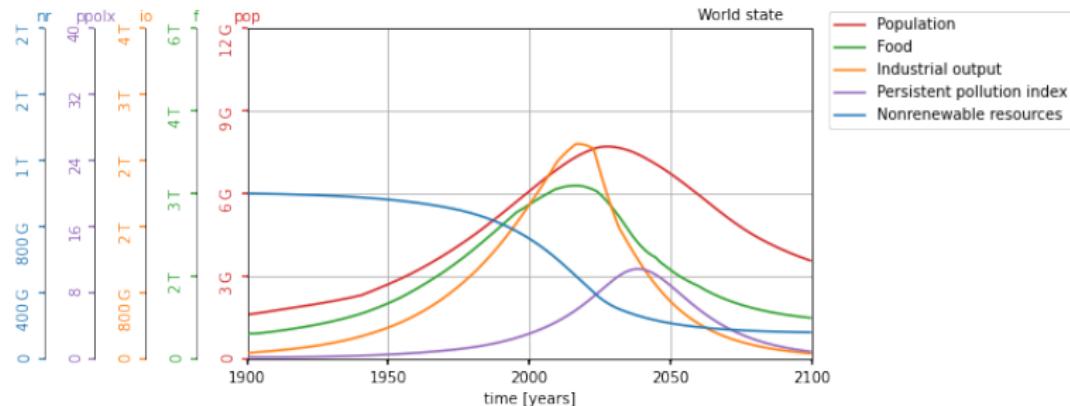
Le modèle



World3

Les simulations

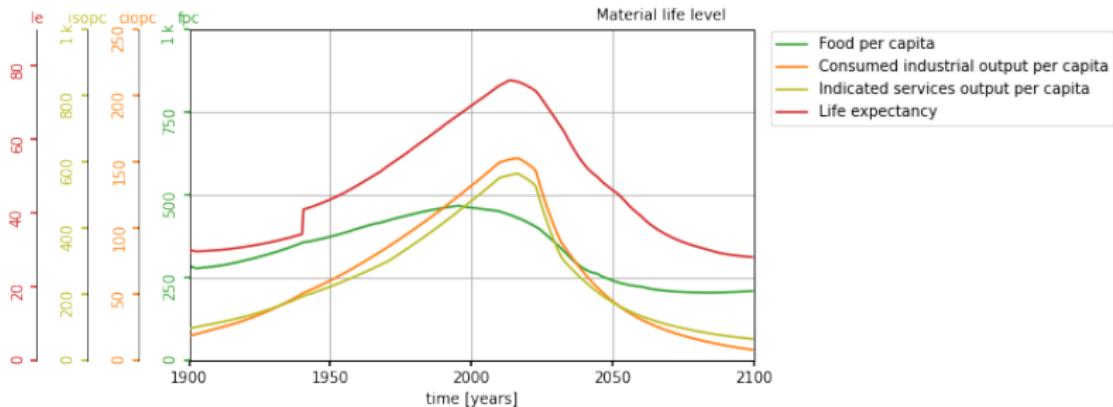
Scénario 1: Business as usual



World state

- Population
- Food
- Industrial output
- Persistent pollution index
- Nonrenewable resources

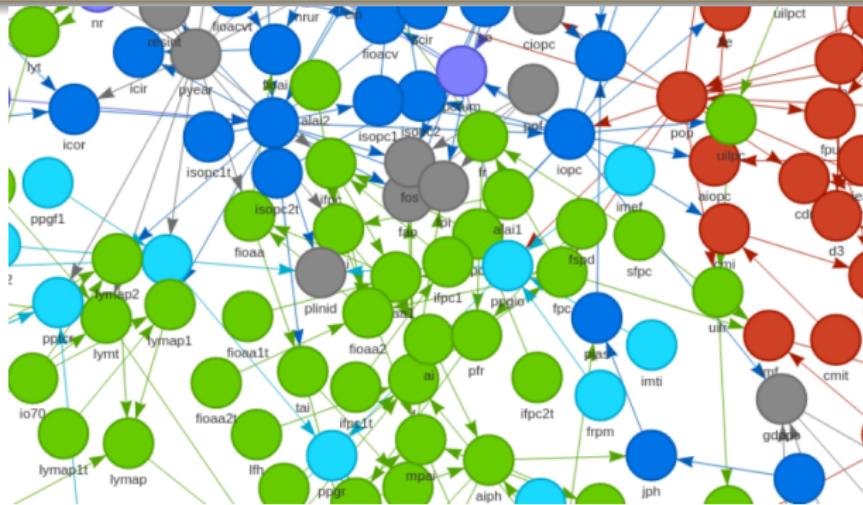
Material life level



- Food per capita
- Consumed industrial output per capita
- Indicated services output per capita
- Life expectancy

Développement Qualitatif
Technocratisme Planification Coûts-Bénéfice Révolution Politique
Progrès Social Confort
Vision coloniale Prévisionisme Environnement
Écologie Catastrophisme Technologie Autonomie Occidental
Catastrophisme Décideurs Idéalisme
Élite Gestionnaire

Pydynamo



Pydynamo

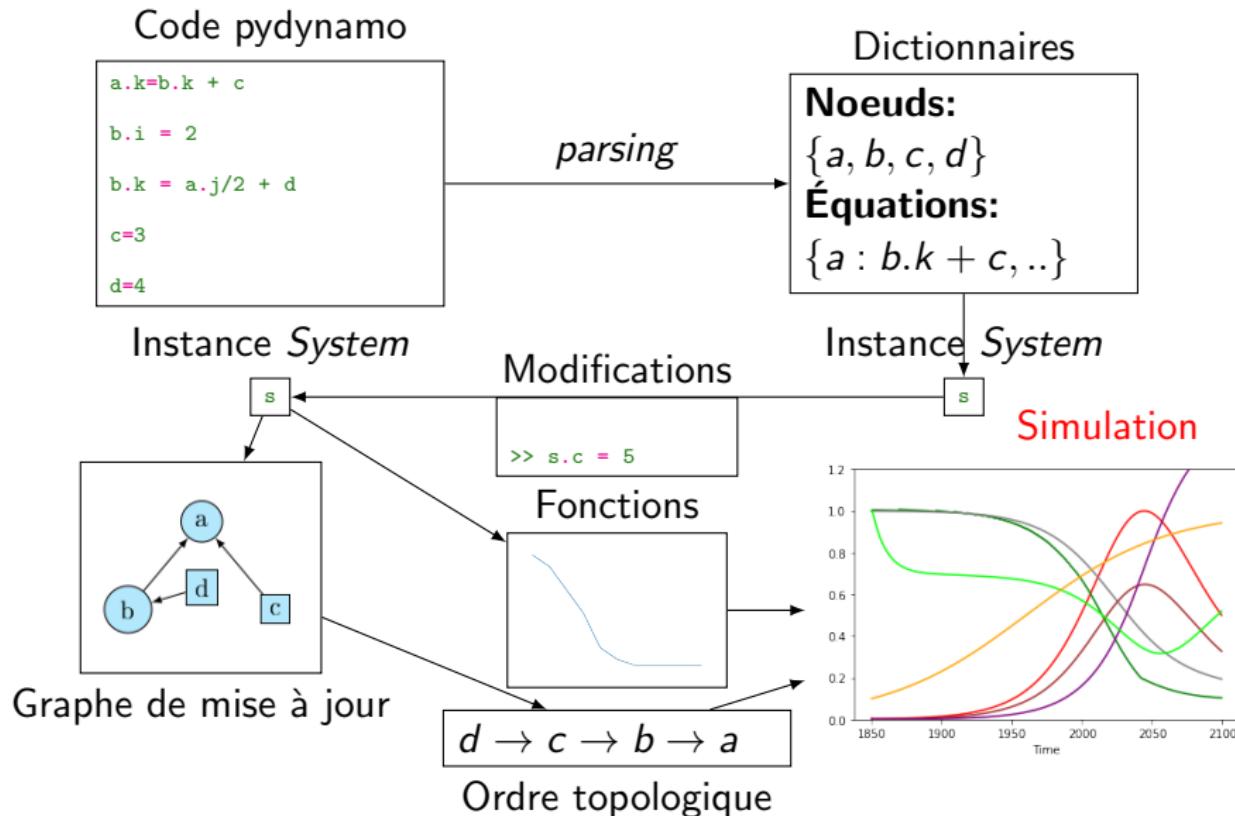
La syntaxe

```
NOTE  
NOTE AGRICULTURAL SECTOR  
NOTE  
NOTE LOOP 1: FOOD FROM INVESTMENT IN LAND DEVELOPMENT  
NOTE  
84 A LFC.K=AL.K/PALT  
C PALT=3.2E9  
85 L AL.K=AL.J+(DT)*(LDR.JK-LER.JK-LRUI.JK)  
N AL=ALI  
C ALI=.9E9  
86 L PAL.K=PAL.J+(DT)*(-LDR.JK)  
N PAL=PALI  
C PALI=2.3E9  
87 A F.K=LY.K*AL.K*LFH*(1-PL)  
C LFH=.7  
C PL=.1  
88 A FPC.K=F.K/POP.K  
89 A IFPC.K=CLIP(IFPC2.K,IFPC1.K,TIME.K,PYEAR)  
90 A IFPC1.K=TANBL(IFPC1T,IOPC.K,0,1600,200)  
T IFPC1T=[230,480,690,850,970,1070,1150,1210,1250]
```

```
# Agricultural sector  
## Loop1: food from investment in land development  
lfc.k = al.k/palt  
palt = 3.2e9  
al.k = al.j + dt*(ldr.j - ler.j - lrui.j)  
al.i = ali  
ali = 0.9e9  
pal.k = pal.j + dt*(-ldr.j)  
pal.i = pali  
pali = 2.3e9  
f.k = ly.k*al.k*lfh*(1-pl)  
lfh = 0.7  
pl = 0.1  
fpc.k = f.k/pop.k  
ifpc.k = clip(ifpc2.k, ifpcl.k, time.k, pyear)  
ifpcl.k = tabhl(ifpclt, iopc.k, 0, 1600, 200)  
ifpclt = [230, 480, 690, 850, 970, 1070, 1150, 1210, 1250]
```

Pydynamo

Fonctionnement



Pydynamo

La documentation

tpworld3

Search docs

World 2

World 3

World3 tutorial

All sectors

- Population sector
- Capital sector
- Agricultural sector
 - ltc: Land Fr Cult
 - palt: Potentially Arable Land Total
 - al: Arable Land
 - ali: Initial Arable Land
 - pali: Potentially Arable Land
 - pal: Initial Potentially Arable Land
 - f: Food
 - lfh: Land Fraction Harvested
 - pl: Processing Loss
 - fpc: Food Per Capita
 - ifpc: Indicated Food Per Capita
 - itpc1: Indicated Food Per Capita 1
 - itpc1t: Indicated Food Per Capita Table 1
 - ifpc2: Indicated Food Per Capita 2
 - itpc2t: Indicated Food Per Capita Table 2
 - tai: Total Agricultural Investment
 - fioaa: Fraction Of Industrial Output Allocated To Agriculture
 - fioaa1: Fraction Of Industrial Output Allocated To Agriculture 1
 - fioaa1t: Fraction Industrial Output Allocated To Agriculture Table 1
 - fioaa2: Fraction Of Industrial Output Allocated To Agriculture 2

View page source

all: Average Life Of Land

Variable

Agricultural sector

Average Life Of Land [year]

```
all = alin * llmy
```

```
graph LR; alin --> all; llmy --> all;
```

all in the updating graph: (how to read)

In nodes

alin : average life of land normal

llmy : land life multiplier from land yield

Out nodes

ler : land erosion rate

Pydynamo

Le TP

jupyter TP Last Checkpoint: 02/16/2022 Autosave Failed!

Logout Control Panel Python 3 (ipykernel) Not Trusted

File Edit View Insert Cell Kernel Widgets LaTeX_envs Help

In [8]:

```
1 print(w.equation('fcaor1'))
2 print(w.definition('nrfr'))
3 plot_non_linearity(w, 'fcaor1')
```

fcaor1.k = NLF_fcaor1(nrfr,k)
fraction of resources remaining

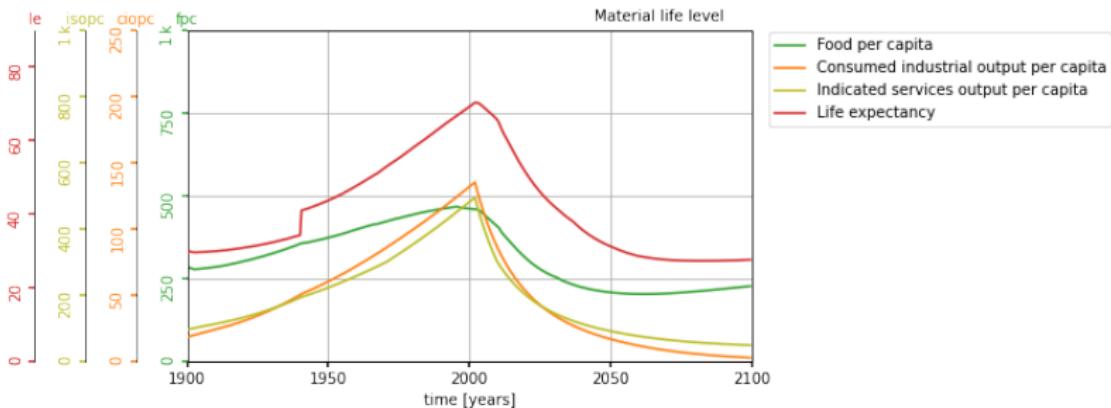
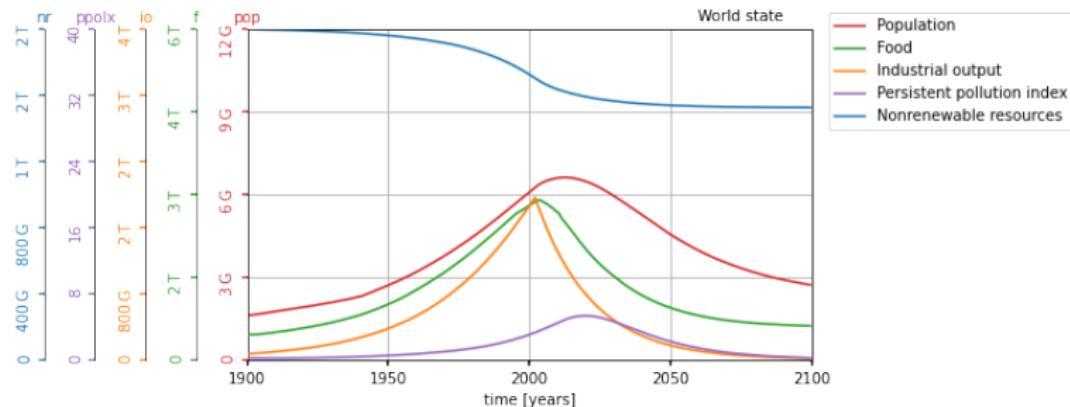
fcaor1 non-linear function

Il faut beaucoup creuser pour extraire du cuivre dans certaines mines !

Pydynamo

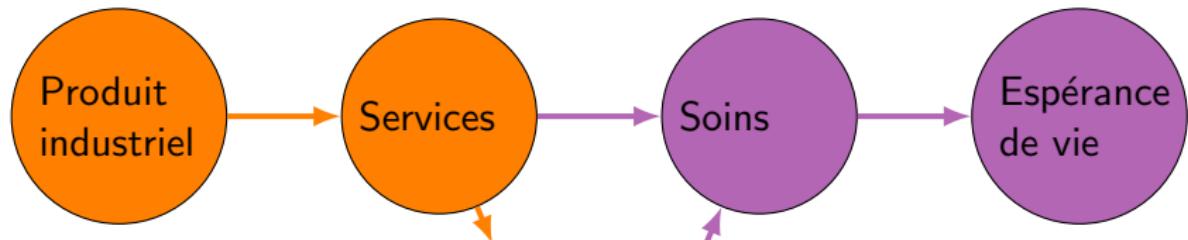
Décroissance

Scénario de décroissance industrielle

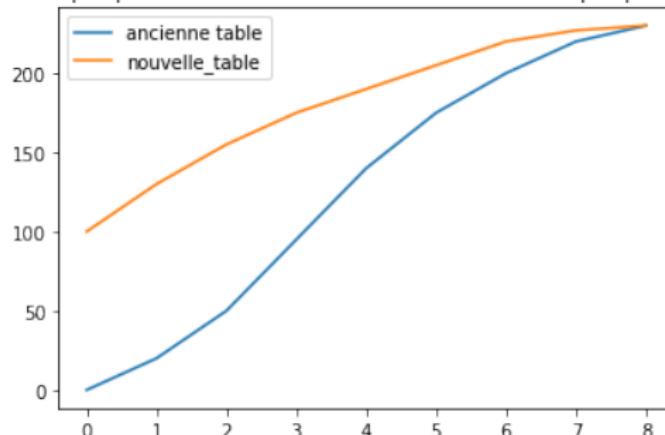


Pydynamo

Décroissance: santé autonome

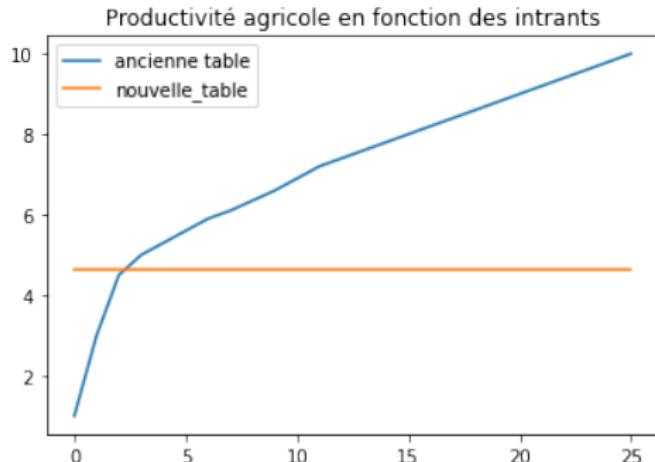
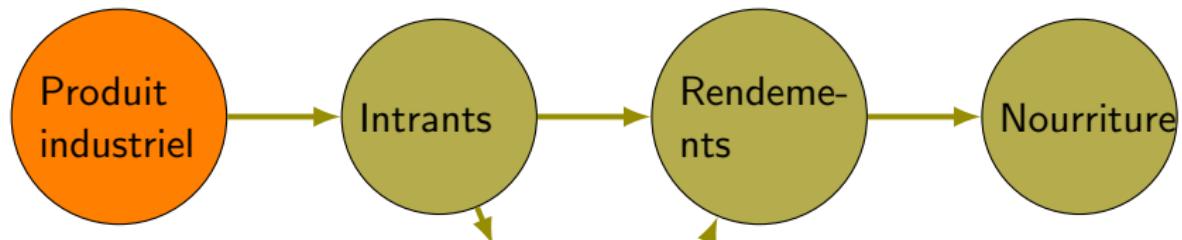


Soins par personne en fonction des services totaux par personne



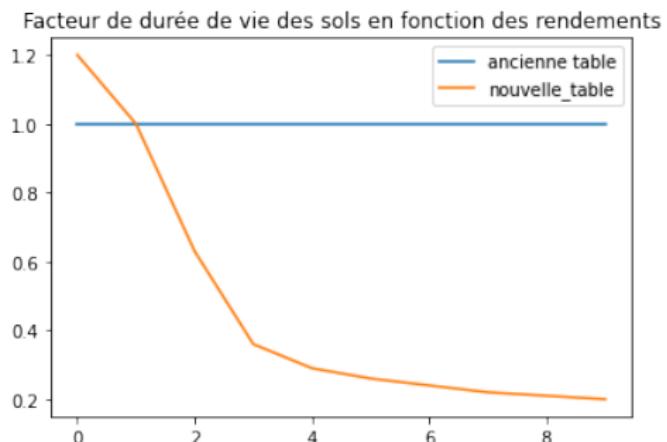
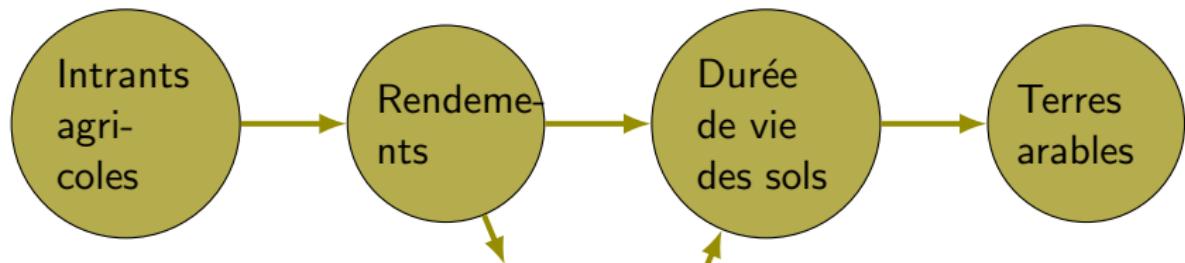
Pydynamo

Décroissance: agroécologie



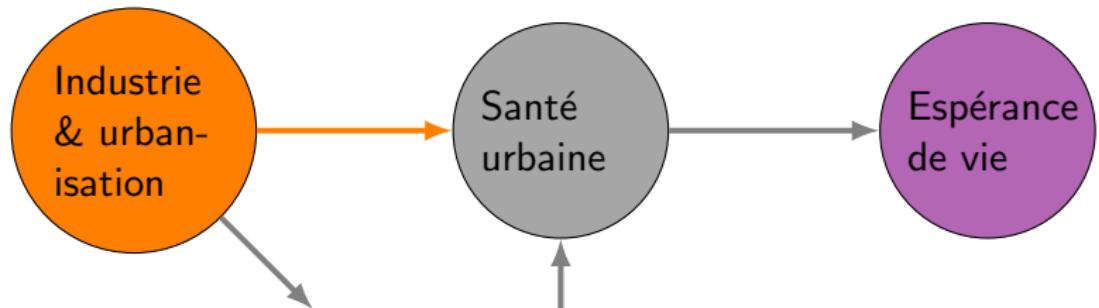
Pydynamo

Décroissance: agroécologie

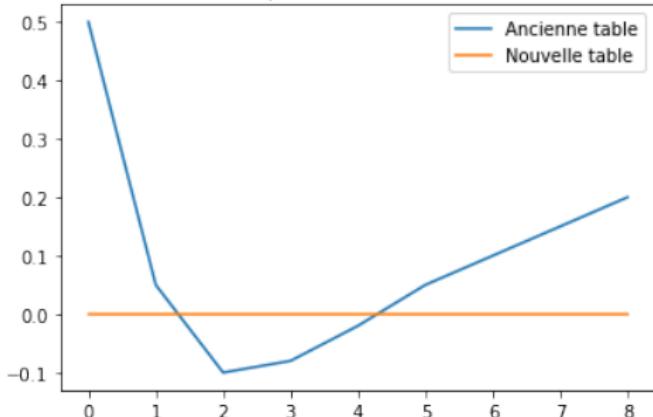


Pydynamo

Décroissance: urbanisme



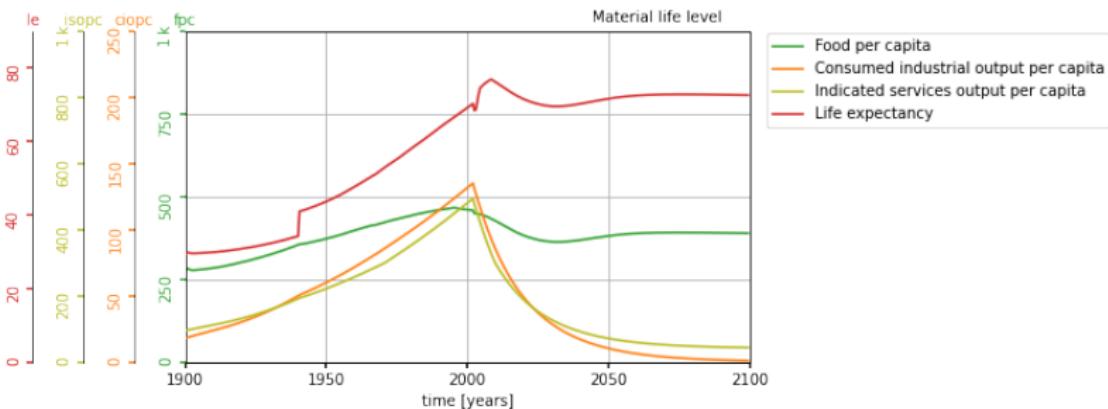
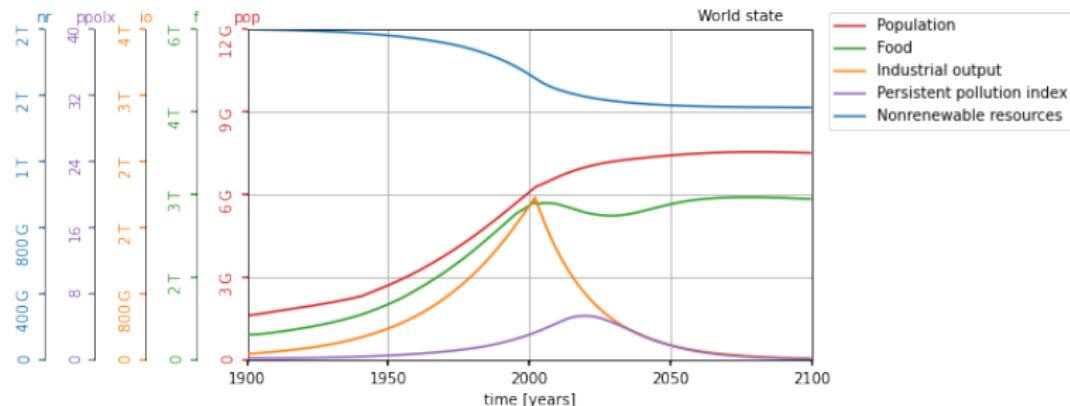
Nouvelle table pour cmi avec la nature urbaine



Pydynamo

Décroissance: réunion des alternatives

Deuxième réunion des alternatives



La recherche scientifique

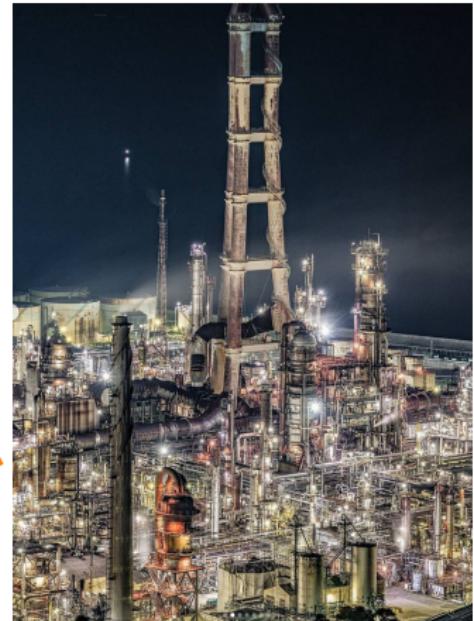
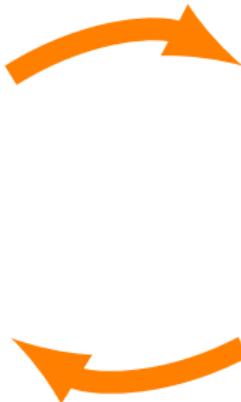


La recherche scientifique

N'est pas neutre

Macrosystème technique

Science



Albert Besnard, La Vérité entraînant les Sciences à sa suite répand sa lumière sur les hommes (1890)
@frederico_italiano, Tetsurou Kobayashi

La recherche scientifique

En question



©requisitus 2014, Hong Kong

La recherche scientifique

Questions



@africanceremonies, Dinka Cattle Camp, South Sudan ,2006

Sources

Pour la partie sur la recherche scientifique

Livres

- ▶ Technocritiques, François Jarriges
- ▶ Fragilité de la puissance, Alain Gras
- ▶ Némésis médicale, Ivan Illich
- ▶ Petit éloge de l'anarchisme, James Scott

Audios

- ▶ Anthropologie de la nature, cours au collège de France de Philippe Descola
- ▶ Technotombeau, Floraisons
- ▶ Allons-nous continuer la recherche scientifique, discours au CERN d'Alexandre Grotendieck

Blogs, sites

- ▶ Critique du scientisme: <https://sniadecki.wordpress.com/>
- ▶ Low-tech: <https://lapenseeecologique.com/6312-2/>
- ▶ Mythes de la rationalité :
<https://www.terrestres.org/2022/02/25/guerre-des-mondes-guerre-des-mythes/>