Données et Statistiques en Finance: modèles d'agents: TP3

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Aims

1. To implement Brock and Hommes model
2. To characterise the choice of available strategies
3. To study the influence of parameters

1. Chaos with 3 simple strategies

- Write a function that returns x_t and that takes as input the parameters of Brock and Hommes model

- Define three strategies: $f_0 = 0, f_1 = g, f_2 = -g$. Take $r = 0,01$ and $\lambda = 0.1$(for example). Choose g.

1. Plot x_t as a function of t for $\beta = 1$. Plot also x_t as a function of x_{t-1}.
2. Same for $\beta = 10$. Compare with the $\beta = 1$ case. Why does $x = 0$ become unstable?
3. Same for $\beta = 100$. Compare with the $\beta = 10$ case.

2. Traditional strategies

- Define 4 strategies:
  $f_0 = 0, f_1(x) = 0.9x + 0.2, f_2(x) = 0.9x - 0.2, f_4(x) = (1+r)x$

1. Plot x_t as a function of t for $\beta = 10$. Plot also x_t vs x_{t-1}.

2. Same for $\beta = 100$.

3. Same with $\beta = 10$ and increase λ. Does the stability disappear?

3. Empirical strategies

- Implement the 5 strategies labelled ADA, WTR, STR, LAA and AA in the lecture notes (p. 38).
  - N.B.: you should redefine them as a function of x_t: substract p^f from their definition if they contain this term.
  - define p_{av} as the running average over the last few timesteps.

1. Plot x_t as a function of t for several sets of parameters. When is the model stable/unstable?
2. Plot $n_{h,t}$ as a function of t for some representative price dynamics.