

Données et Statistiques en Finance: modèles d'agents: TP2

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Aims

To investigate how price predictability can be detect, exploited, and modified

1. Optimal learning

1. Choose a couple $(\sigma, \alpha > 1)$ and simulate

$$r_{t+1} = (\alpha - \hat{\alpha}_t)r_t + \varepsilon_{t+1}$$
$$\hat{\alpha}_t = \frac{r_t}{r_{t-1}} + \hat{\alpha}_{t-1}$$

2. Plot r_{t+1} as a function of t . Comment.

2. Optimal learning

1. Plot $P(|r| > R)$, i.e., 1-ecdf with logarithmic axes.

```
from statsmodels.distributions.empirical_distribution import  
ECDF
```

2. Has $P(|r| > R)$ heavy tails?

3. Using the powerlaw library, compute the tail exponent of
 $P(|r|) \propto |r|^{-\gamma}$

```
import powerlaw  
mypl=powerlaw.Fit(np.abs(r))  
mypl.alpha
```

Check whether mypl.alpha is γ or $\gamma + 1$

3. Optimal learning

Characterize how r depends on α and σ :

1. Create a plot of the empirical average of $|r|^{1/2}$ as a function of α et σ ; comment.
2. Create a plot of exponent γ as a function of α and σ ; comment.