# Learning Volatility of Discrete Time Series Using Prediction with Expert Advice: Experimental study

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### Institute for Information Transmission Problems Russian Academy of Sciences

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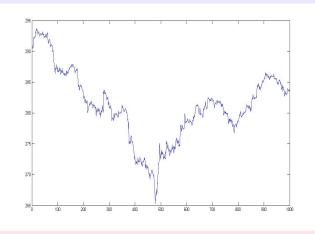
Experimental results

Data types in examples:

- Evolution of a stock price (additional information: evolution of the volume, fluctuation)
- Gain of the FL (Follow Leader) algorithm (no randomness)
- Gain of the FPL algorithm (randomized)



#### Stock price

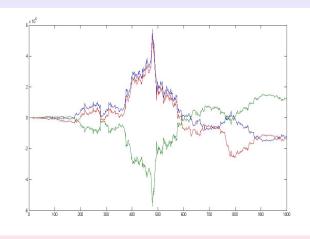


Evolution of the stock price (s=2000,1000)



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#### Merging strategies

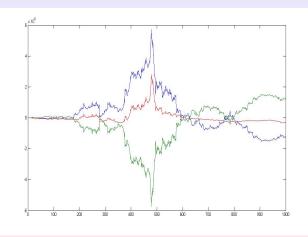


Gain of the FL(Follow Leader algorithm) (s=2000,1000)



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#### Merging strategies

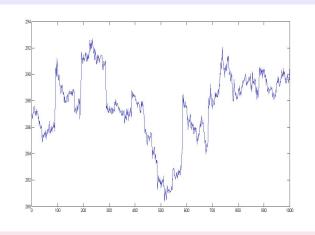


Expected gain of the FPL algorithm (s=2000,1000)



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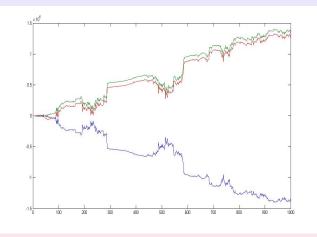
#### Stock price



Evolution of the stock price (s=1000,1000)

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#### Merging strategies

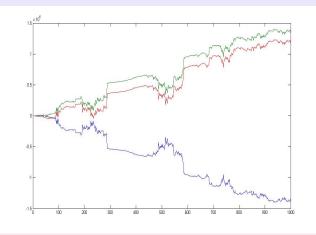


Gain of the FL algorithm (s=1000,1000)

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#### Merging strategies

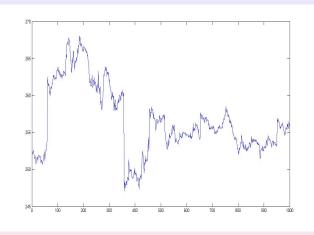


Expected gain of the FPL algorithm (s=1000,1000)



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#### Stock price

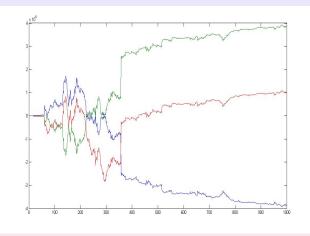


Evolution of the stock price (s=4000,1000)



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#### Merging strategies

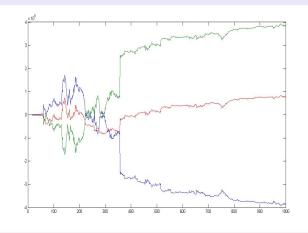


Gain of the FL algorithm (s=4000,1000)

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#### Merging strategies

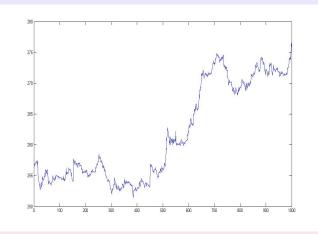


Expected gain of the FPL algorithm (s=4000,1000)



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#### Stock price

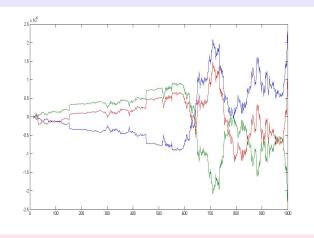


Evolution of the stock price (s=4500,1000)



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#### Merging strategies



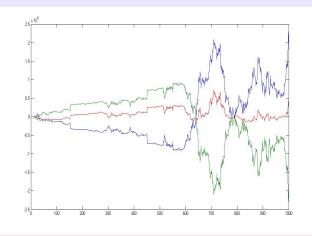
Gain of the FL algorithm, (s=4500,1000)



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#### Merging strategies

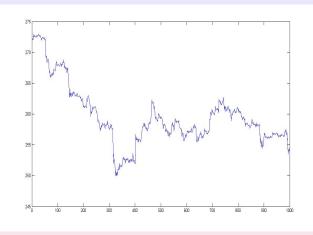


Expected gain of the FPL algorithm, (s=4500,1000)



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#### Stock price

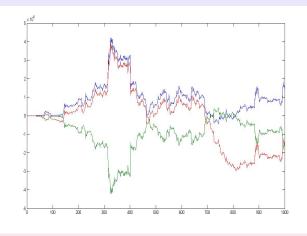


Evolution of the stock price (s=6400,1000)



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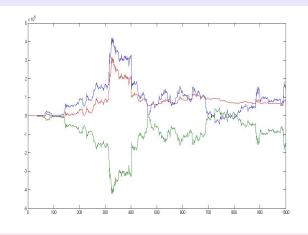
#### Merging strategies



Gain of the FL algorithm, (s=6400,1000)

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#### Merging strategies

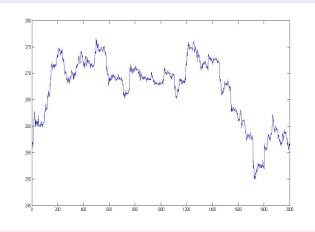


Expected gain of the FPL algorithm, (s=6400,1000)



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#### Stock price

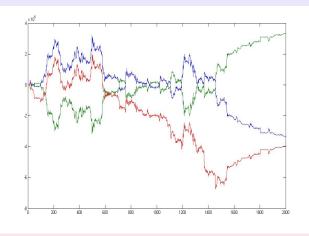


Evolution of the stock price (s=5000,2000)



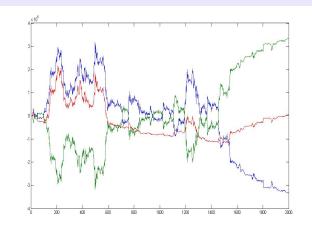
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#### Merging strategies



Gain of the FL algorithm, (s=5000,2000)

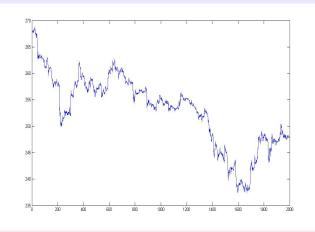
#### Merging strategies



Expected gain of the FPL algorithm, (s=5000,2000)



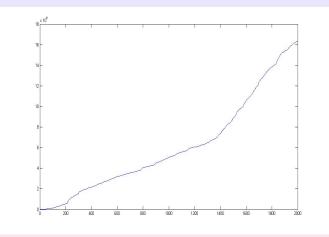
#### Stock price



Evolution of the stock price (s=6500,2000)

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#### Volume

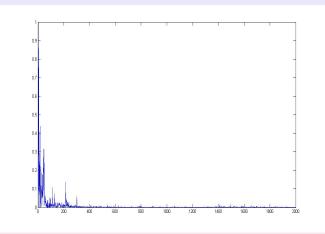


Evolution of the volume of the game (s=6500,2000)



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#### Fluctuation

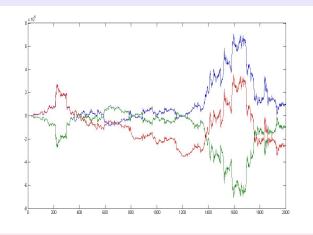


Fluctuation of the game (s=6500,2000)



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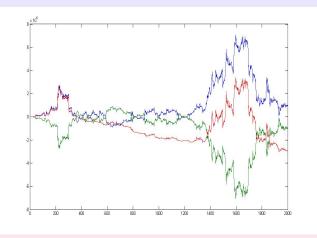
#### Gain of the FL algorithm



Gain of the FL algorithm (s=6500,2000)



#### Merging strategies

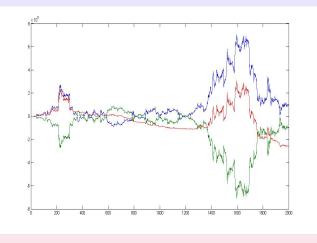


Gain of the FPL algorithm, randomness= 0.5, s=6500,2000



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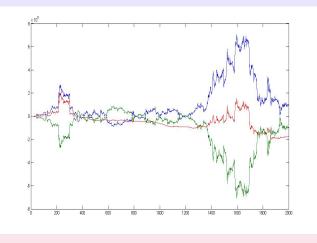
#### Merging strategies



Expected gain of the FPL algorithm, randomness= 0.4, (s=6500,2000)

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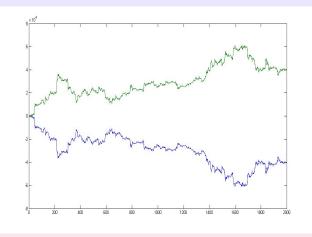
#### Merging strategies



Expected gain of the FPL algorithm, randomness= 0.3, (s=6500,2000)

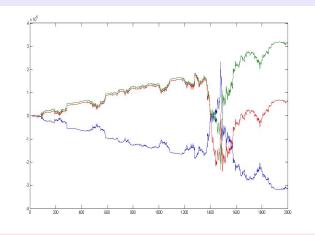
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#### Shares



Evolution of the number of shares of two experts, (s=6500,2000)

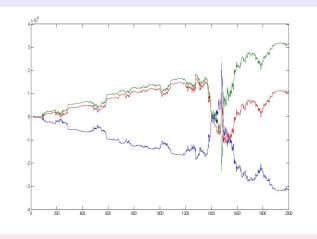
#### Gain of the FL algorithm



Gain of the FL algorithm (s=1000,2000)

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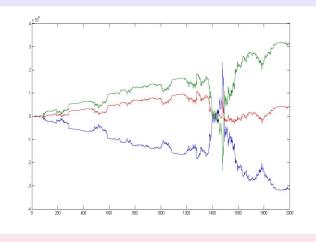
#### Merging strategies



Gain of the FPL algorithm, randomness= 0.5, (s=1000,2000)



#### Merging strategies

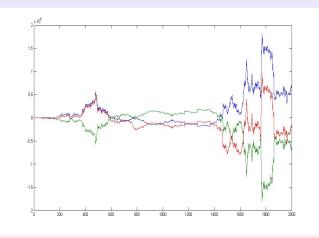


Expected gain of the FPL algorithm, randomness= 0.3, (s=1000,2000)

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#### Gain of the FL algorithm

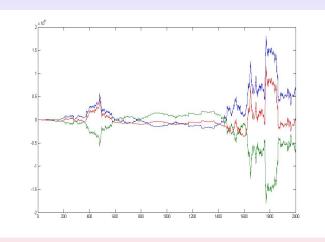


Gain of the FL algorithm (s=2000,2000)

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#### Merging strategies

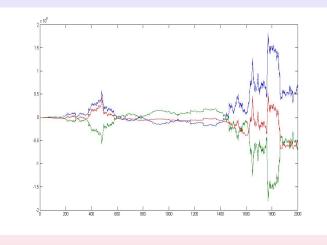


Gain of the FPL algorithm, randomness= 0.5, (s=2000,2000)



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#### Merging strategies

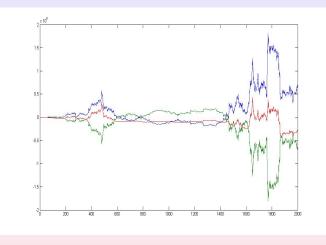


Expected gain of the FPL algorithm, randomness= 0.4, (s=2000,2000)



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#### Merging strategies



Expected gain of the FPL algorithm, randomness= 0.3, (s=2000,2000)

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