Dealing with higher dimensions

VISUALIZING TIME SERIES DATA IN R

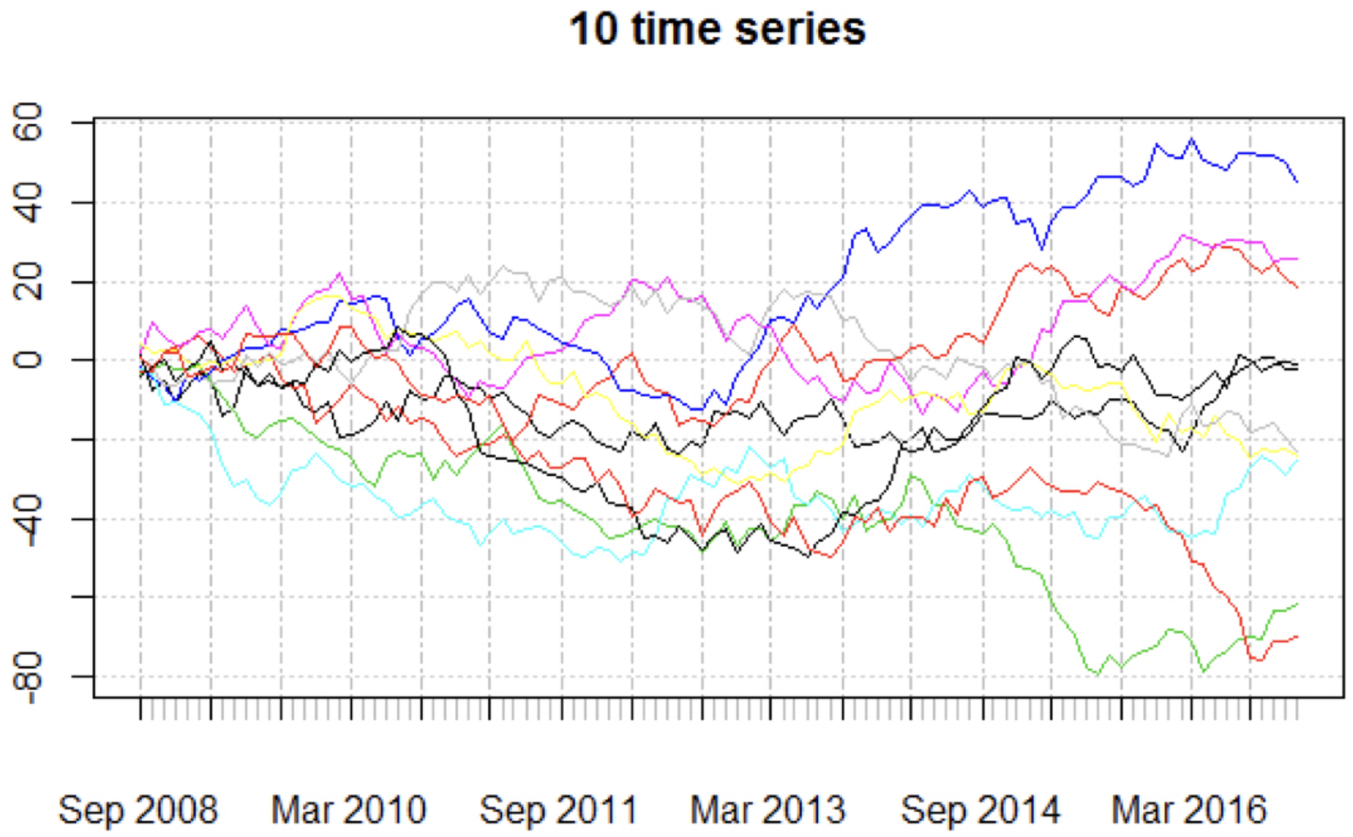
Arnaud Amsellem

Quantitative Trader and creator of the R Trader blog

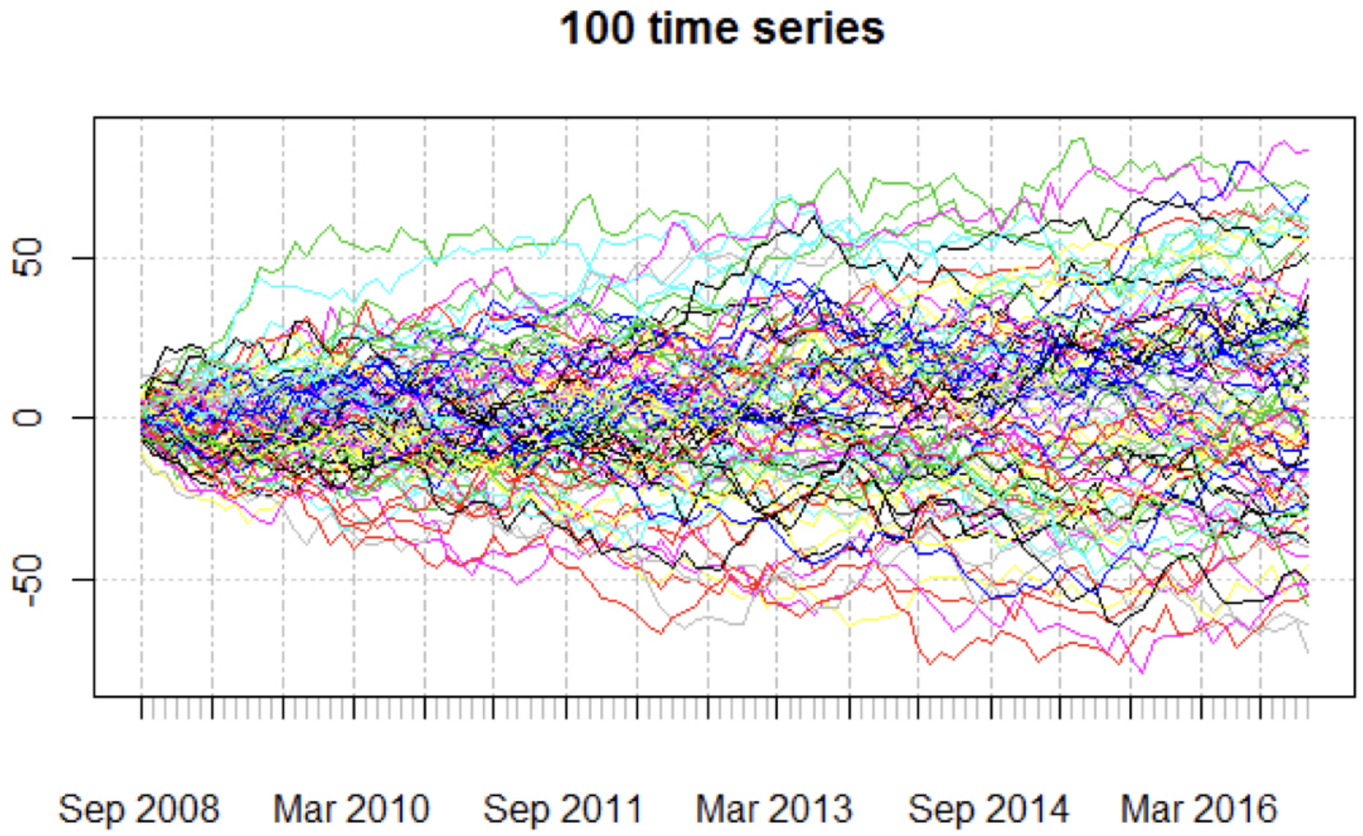
Multiple time series

- Identify how they interact
- Eg.: **single** stock price reaction to interest rates change
- Eg.: stock price reaction of **several** stocks to interest rates change
- Identify **patterns**

10 time series



100 time series



Let's practice!

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Multivariate time series

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datacamp

Stocks

```
head(my_stocks)
```

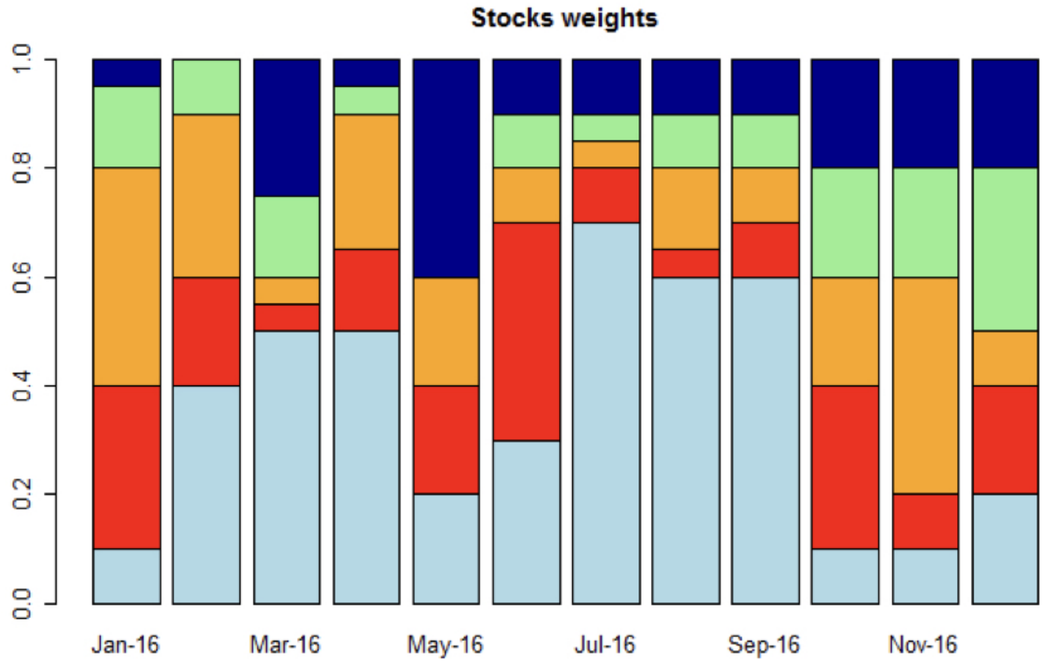
```
    Stock A  Stock B   Stock C  Stock D   Stock E
1   -0.0320  -0.0092   -0.0286  -0.0314   -0.0209
2   -0.0358  -0.0148    0.0001  -0.0162    0.0016
3    0.0092   0.0126    0.0139  -0.0016   -0.0127
4    0.0149   0.0290    0.0377   0.0246    0.0332
5   -0.0226  -0.0084    0.0011  -0.0016   -0.0102
6   -0.0079  -0.0126   -0.0249  -0.0059   -0.0187
```

```
head(stock_weights)
```

```
       Stock A Stock B Stock C Stock D Stock E
Jan-16     0.1    0.30    0.40    0.15    0.05
Feb-16     0.4    0.20    0.30    0.10    0.00
Mar-16     0.5    0.05    0.05    0.15    0.25
Apr-16     0.5    0.15    0.25    0.05    0.05
May-16     0.2    0.20    0.20    0.00    0.40
Jun-16     0.3    0.40    0.10    0.10    0.10
```

Stacked chart

```
# stacked chart of the weights of 5 stocks in a portfolio
barplot(stock_weights,
        col = c("lightblue", "red", "orange", "lightgreen", "darkblue"),
        main = "Stocks weights")
```



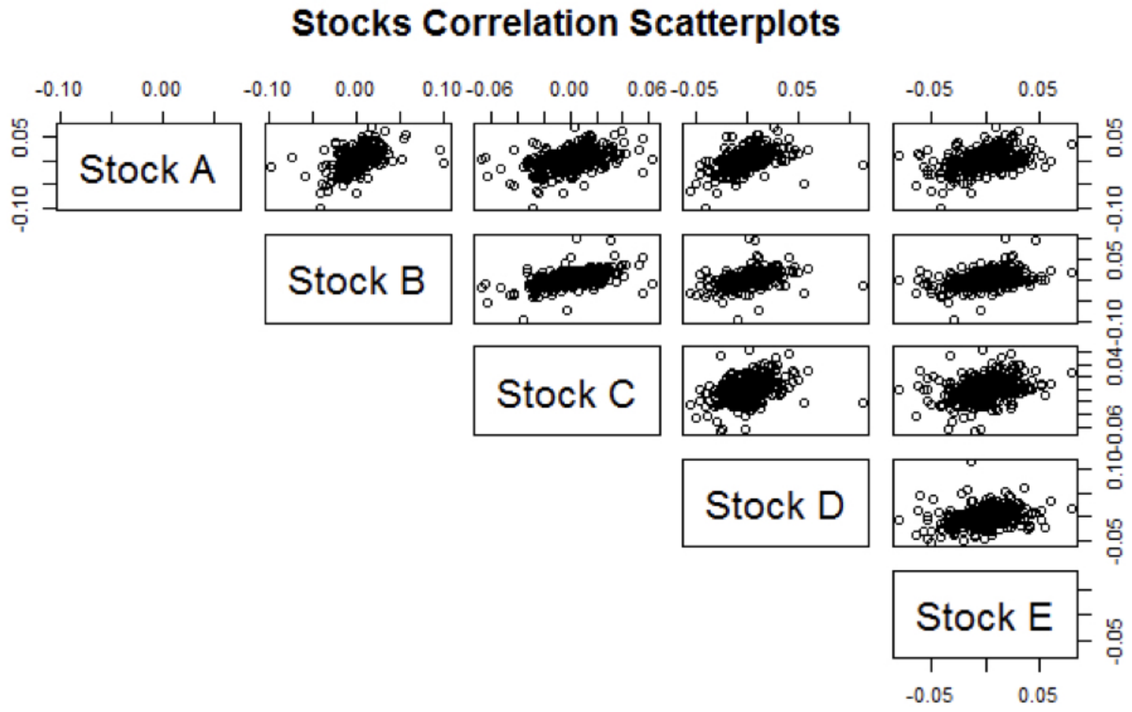
Correlation matrix with numbers

```
round(cor(my_stocks), digit = 4)
```

```
         Stock A  Stock B  Stock C  Stock D  Stock E
Stock A   1.0000   0.4841   0.4292   0.5085   0.4029
Stock B   0.4841   1.0000   0.5133   0.3955   0.4329
Stock C   0.4292   0.5133   1.0000   0.3628   0.3414
Stock D   0.5085   0.3955   0.3628   1.0000   0.2939
Stock E   0.4029   0.4329   0.3414   0.2939   1.0000
```

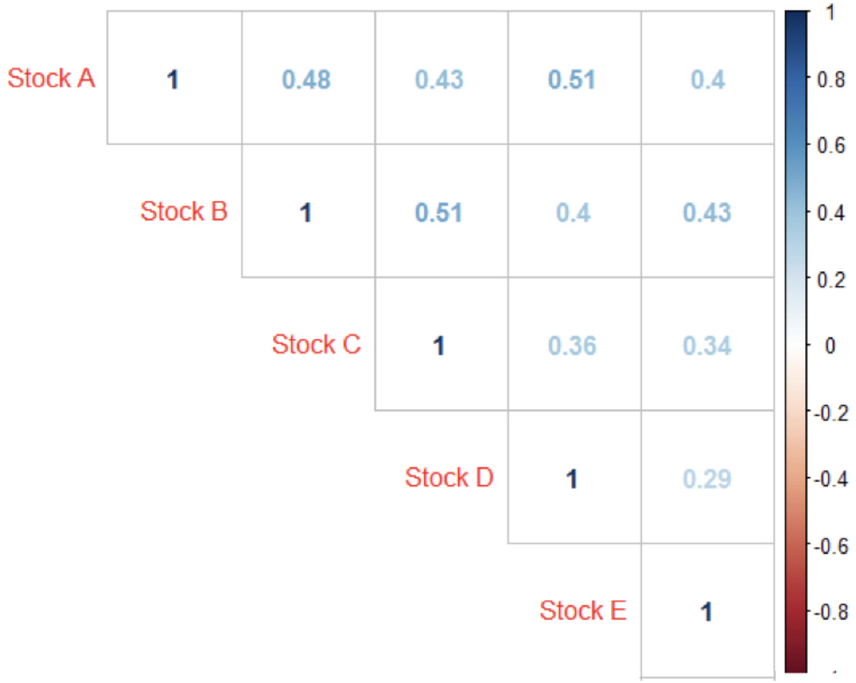
Correlation matrix with scatterplots

```
pairs(my_stocks,
      lower.panel = NULL,
 main = "Stocks Correlation Scatterplots")
```



corrplot()

```
corrplot(my_stocks,
 method = "number",
 type = "upper")
```



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Higher dimension time series

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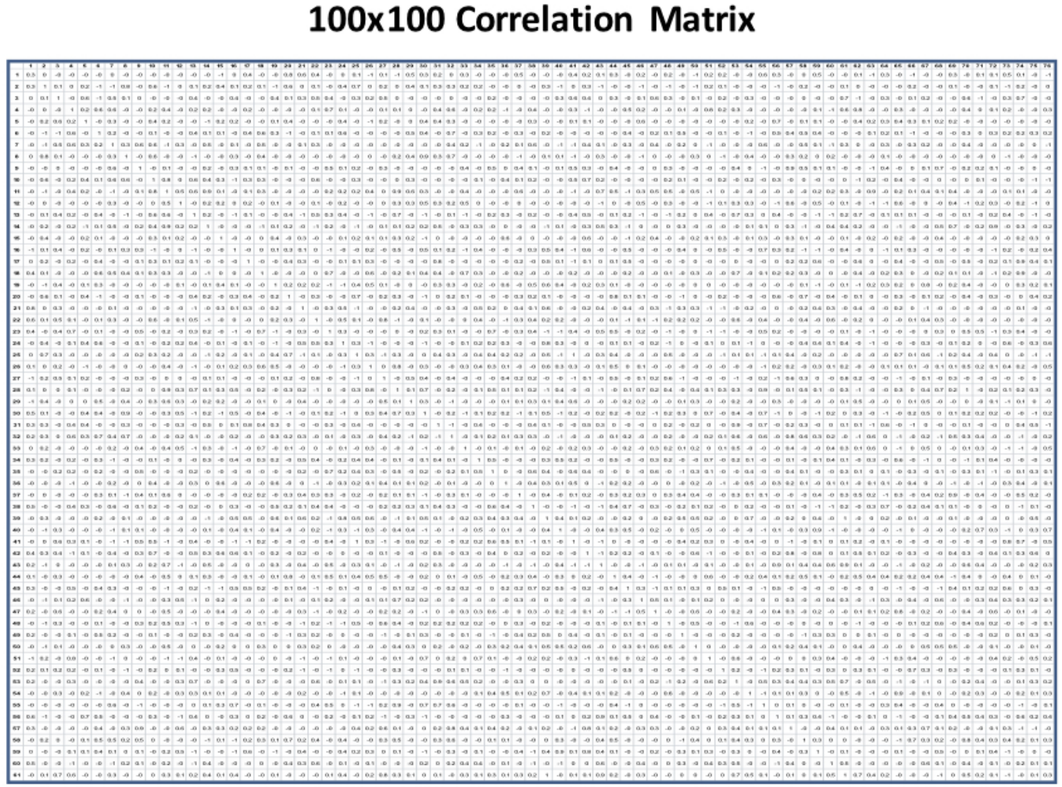
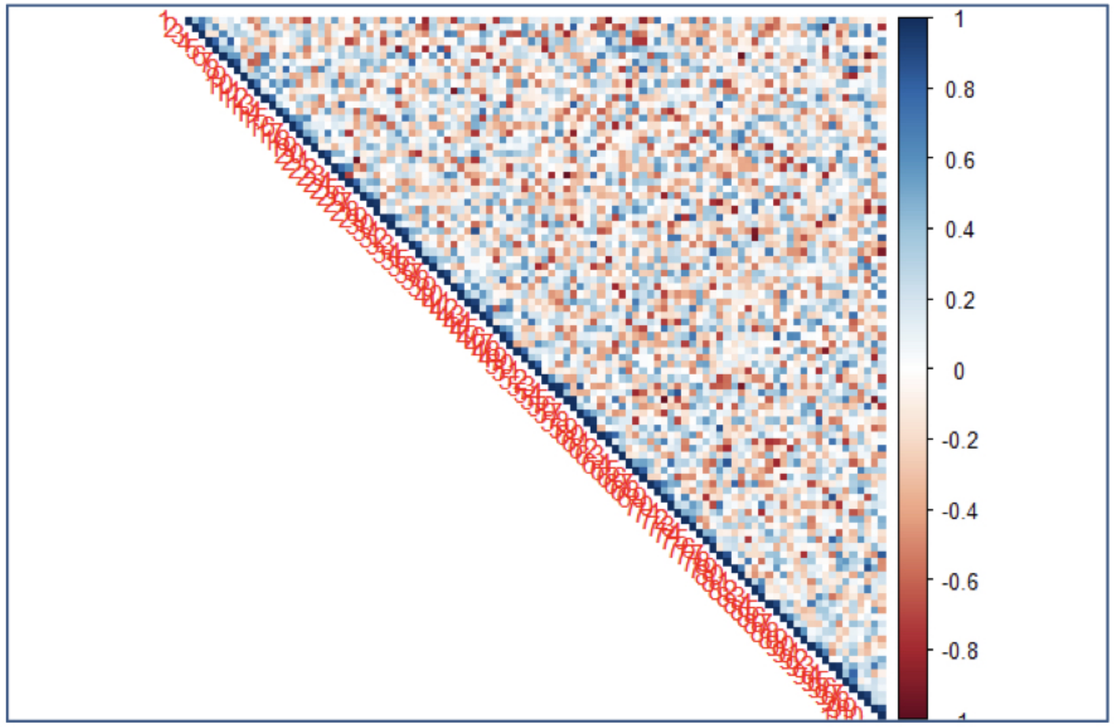
100 x 100 correlation matrix

```
cor_mat
```



Correlation matrix as heatmap

```
corrplot(cor_mat, method = "color", type = "upper")
```



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