VAR Models for Time Series Analysis and Forecasting

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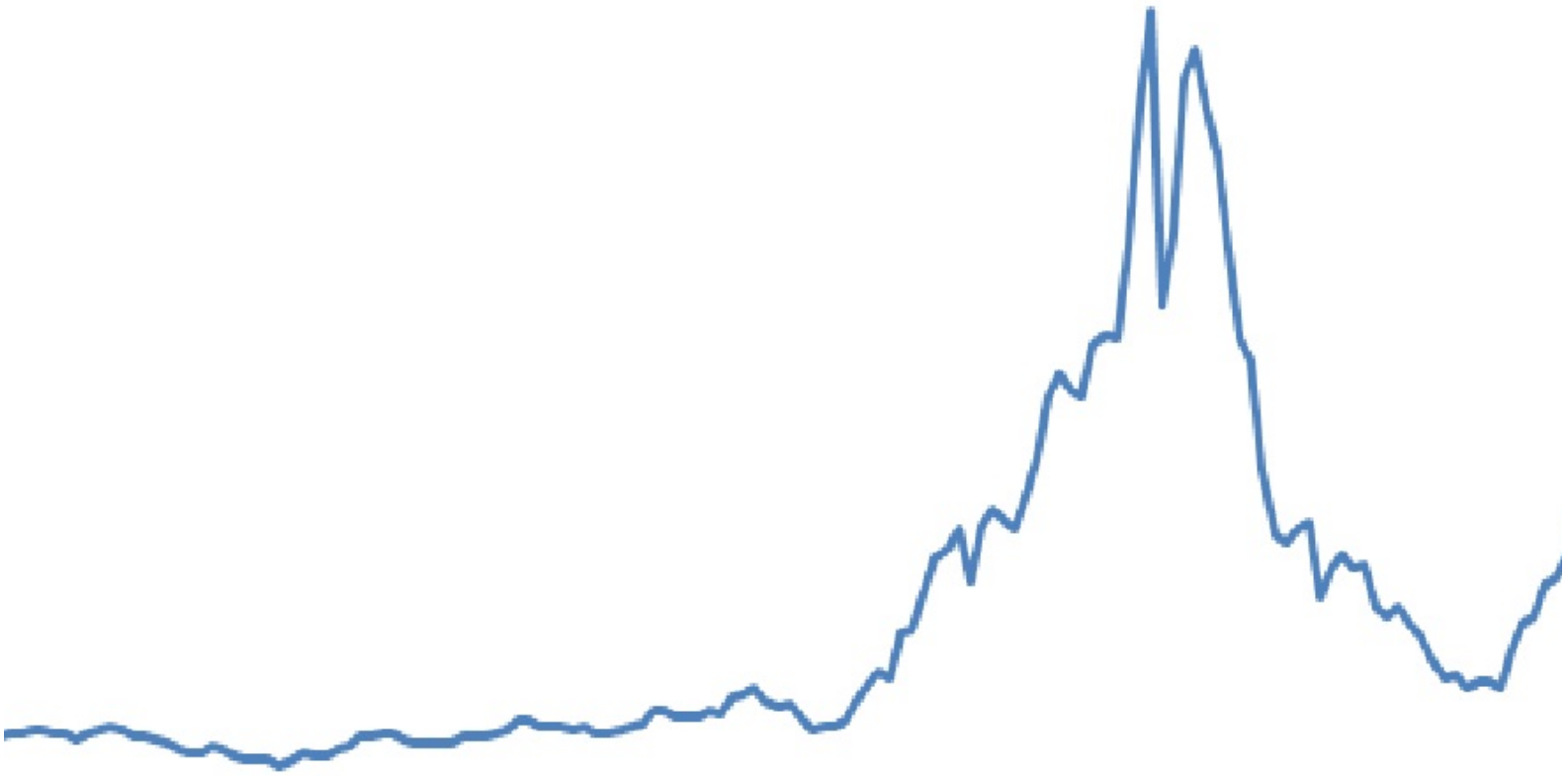
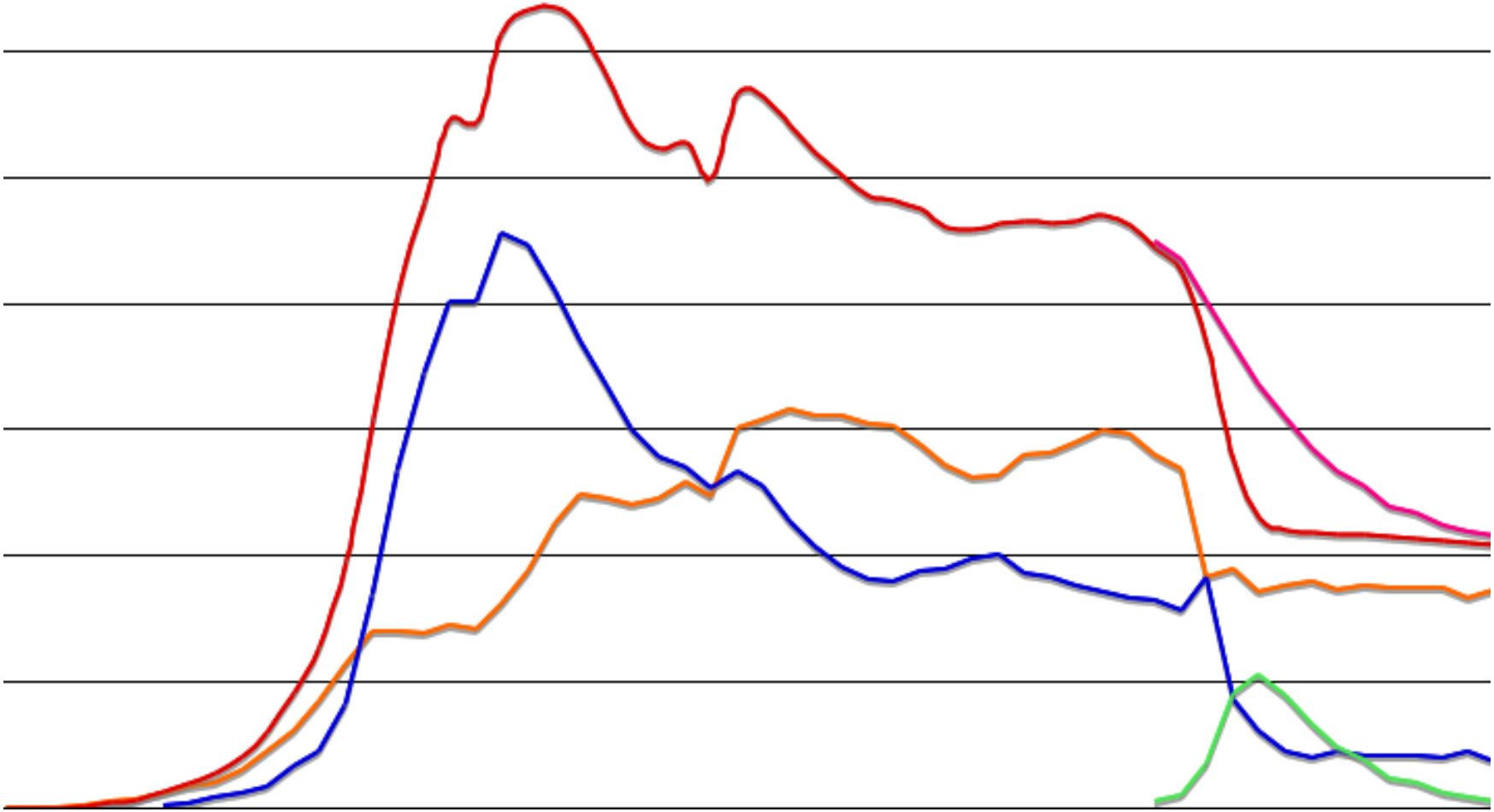
What is a Time Series?

Data points indexed in time order

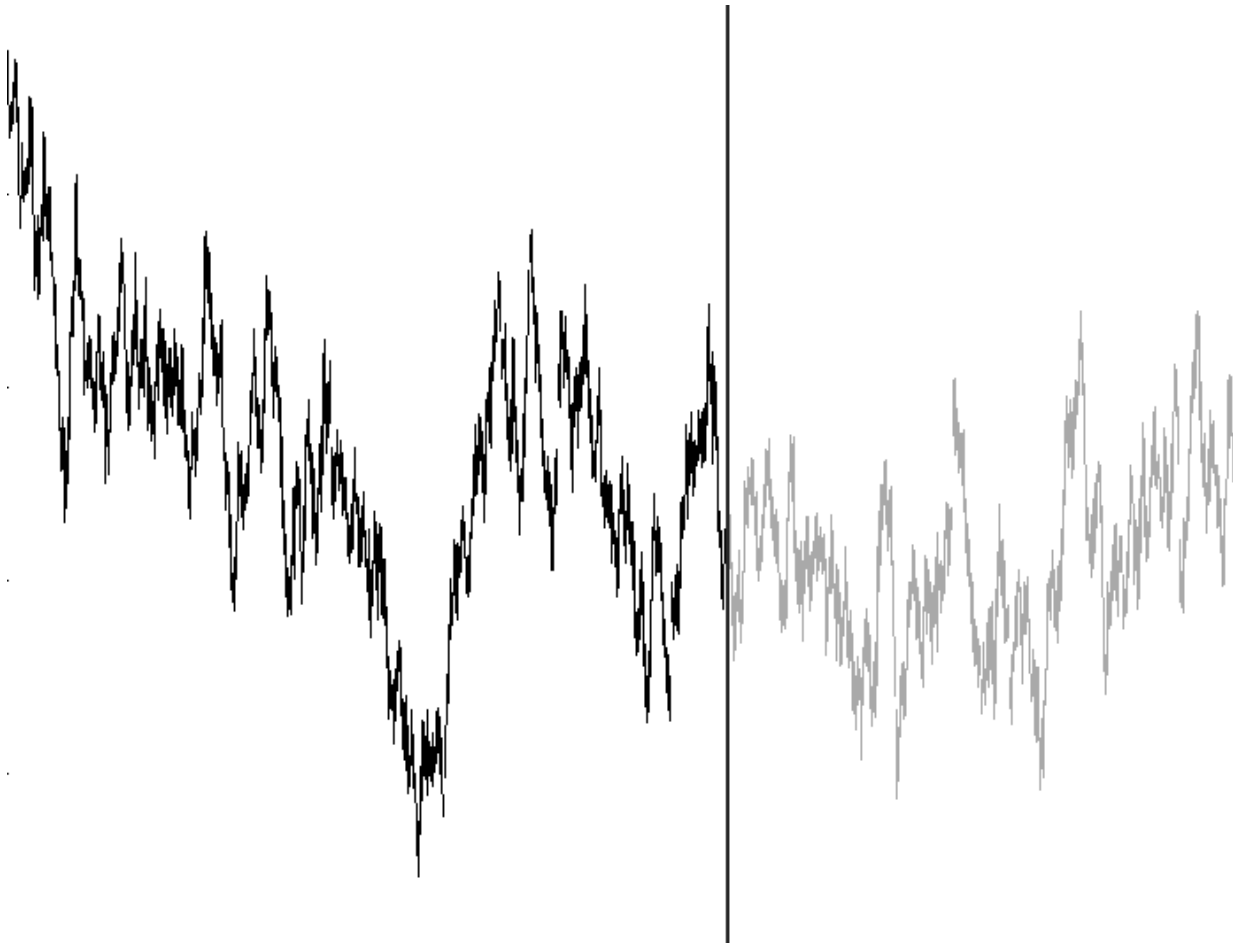


Multivariable



What can we do with them?

Modeling and Forecasting



How?

Autoregression

The value of variable depends on its previous values

$$x^{(j)} \approx x^{(j-1)} a_1 + \ldots + x^{(j-i)} a_i + c$$

More variables?

Now we are talking

Vector Autoregression

$$y^{(j)} \approx y^{(j-1)} A_1 + \ldots + y^{(j-i)} A_i + C$$

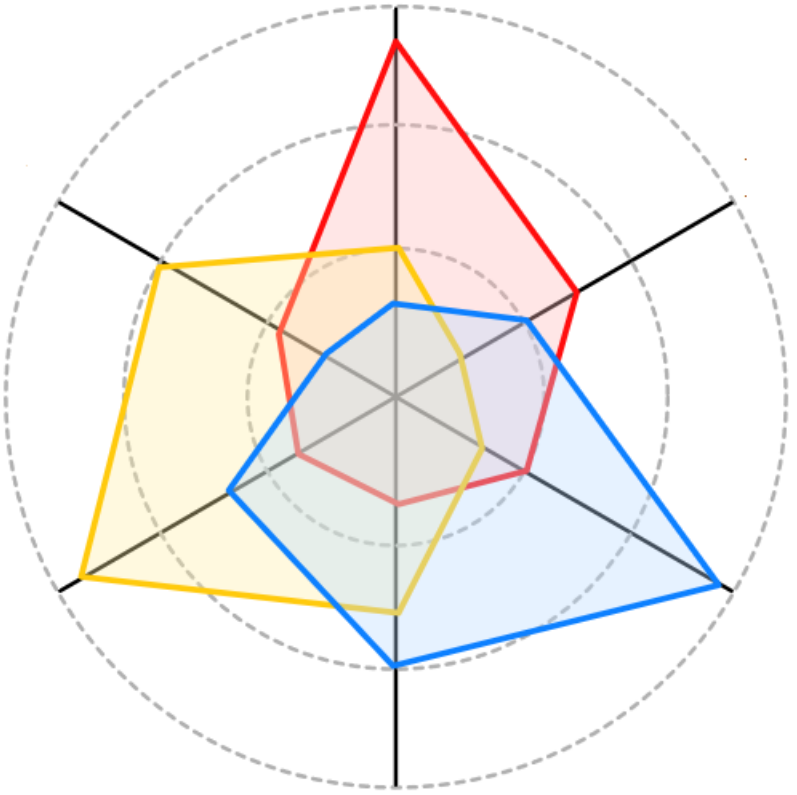
How to find the model?

Huge Computational Problem

Least Squares

$$\begin{pmatrix} y^{(i)} \\ \vdots \\ y^{(t)} \end{pmatrix} = \begin{pmatrix} y^{(i-1)} & \dots & y^{(0)} & z^{(i-1)} & \dots & z^{(i-k)} & 1 \\ \vdots & & \vdots & \vdots & & \vdots & \vdots \\ y^{(t-1)} & \dots & y^{(t-i)} & z^{(t-1)} & \dots & z^{(t-k)} & 1 \end{pmatrix} \begin{pmatrix} A_1 \\ \vdots \\ A_i \\ B_1 \\ \vdots \\ B_k \\ C \end{pmatrix}$$

Metaheuristics



Any Question?

https://fylux.github.io/about/