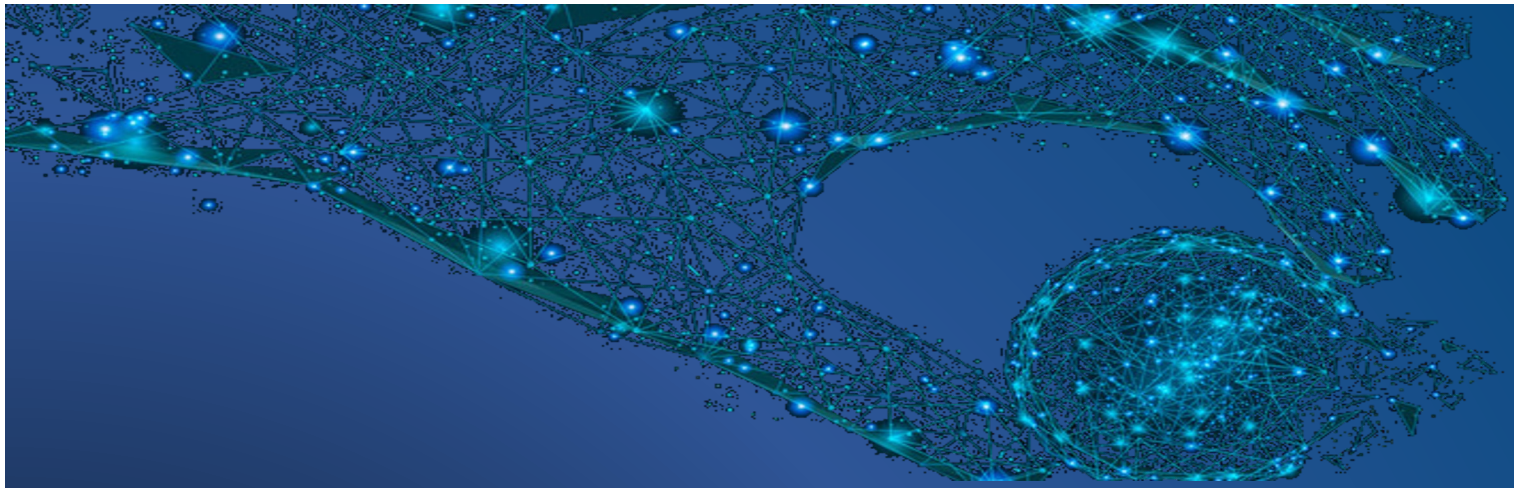

Time Series Transformation

Cláudia Antunes

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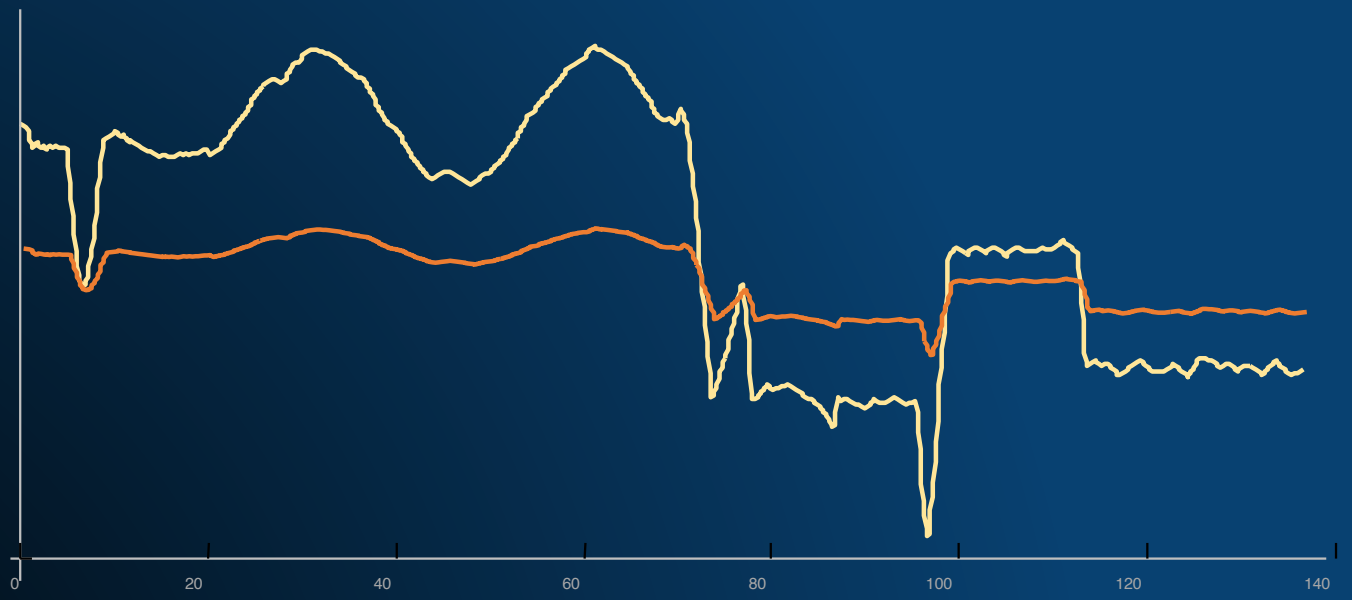
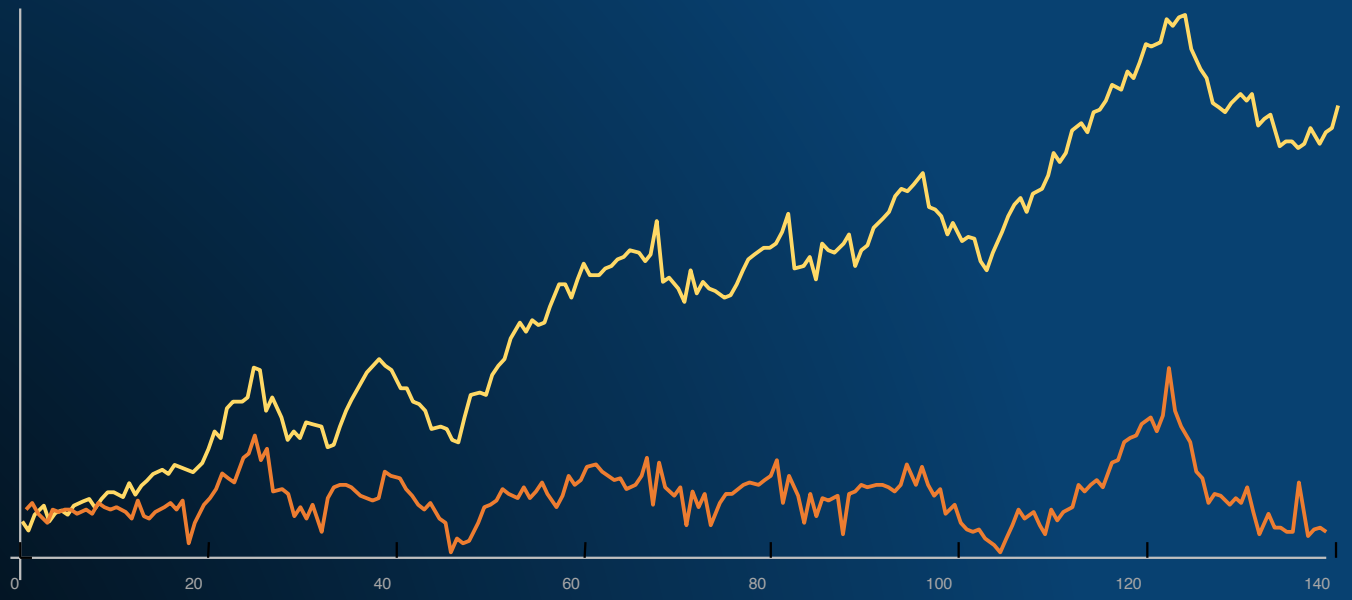
Normalization

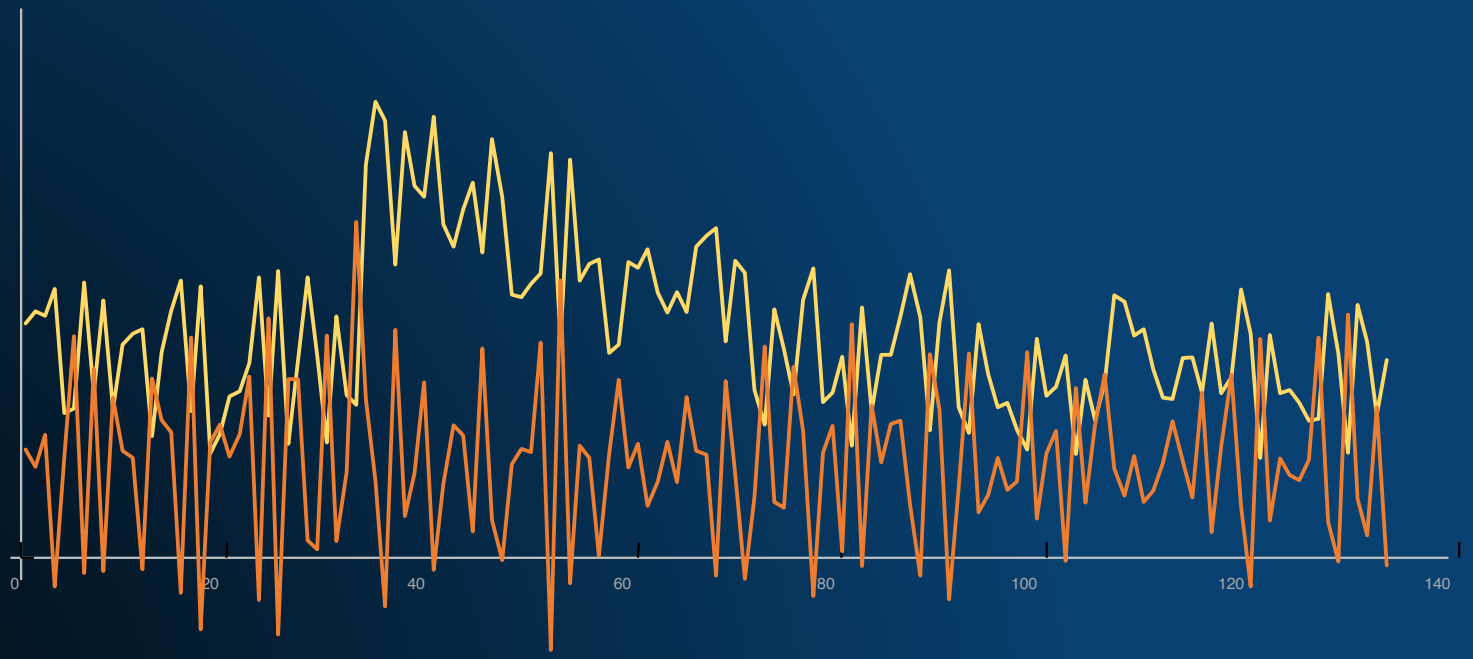


$$X' = \frac{X - mean(X)}{std(X)}$$

Trend Removal



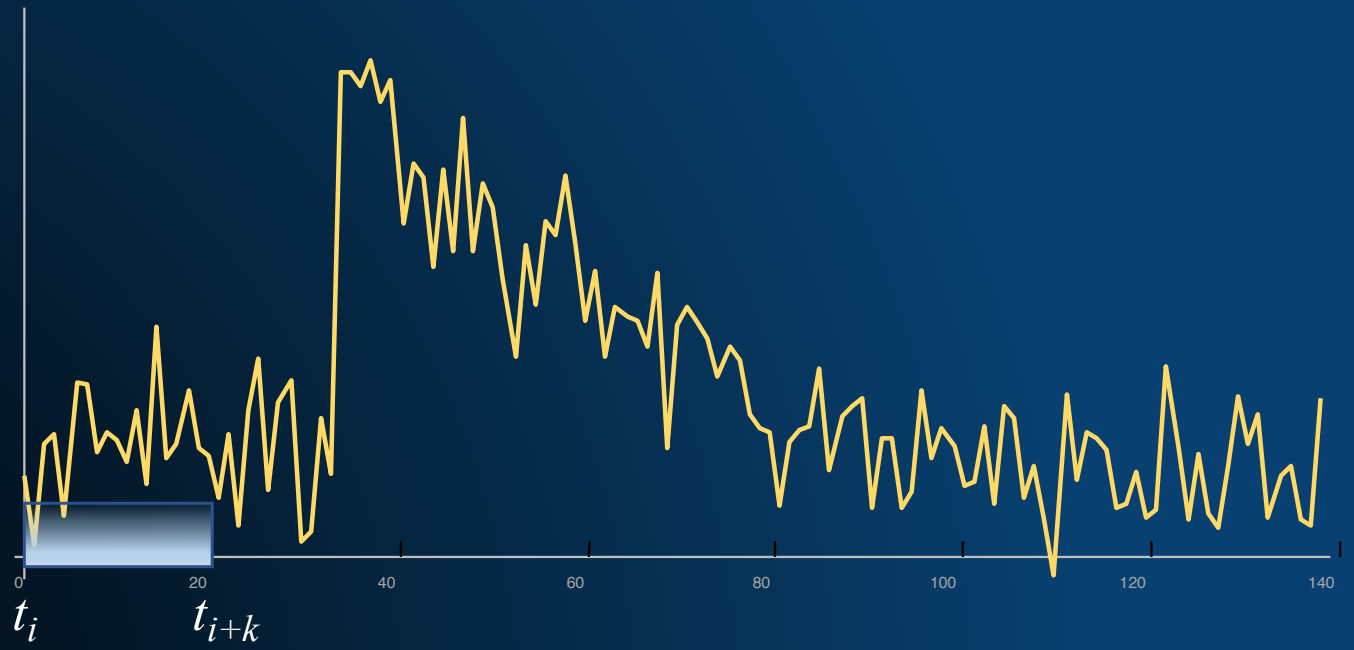
Differencing



Sliding Window

$X = x_1 x_2 \ldots x_n$

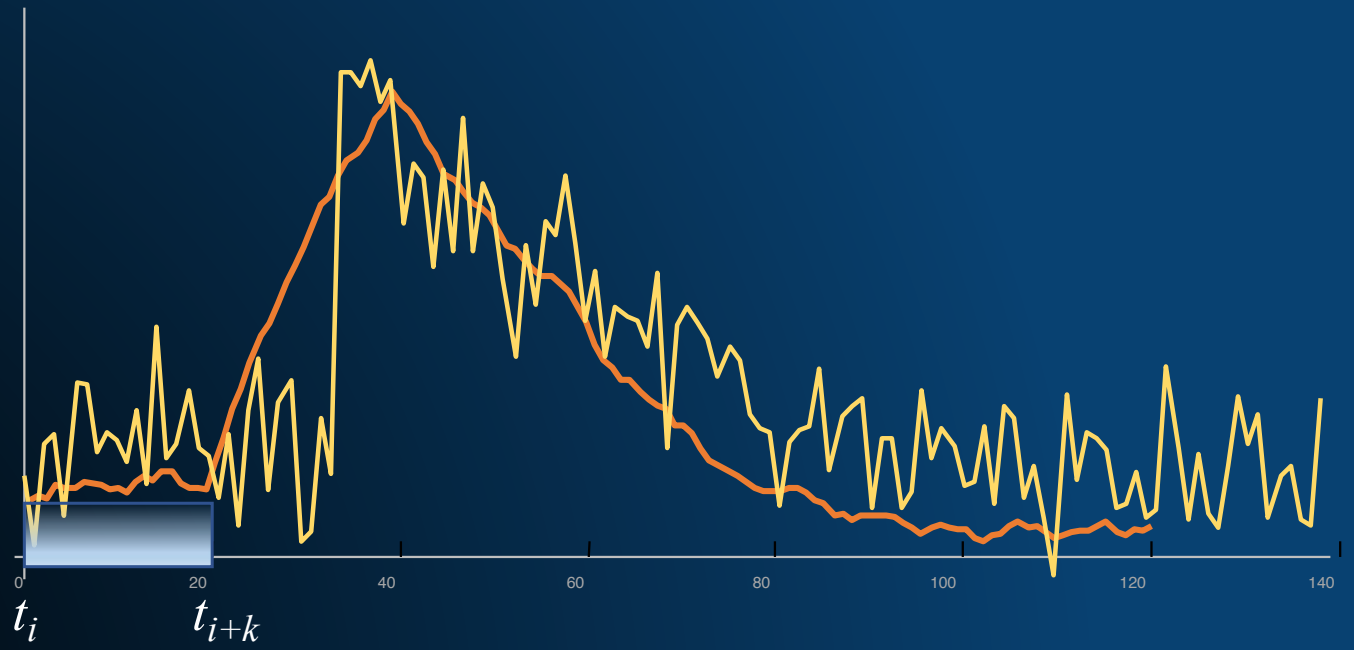
$X' = f(w_1) f(w_2) \ldots f(w_{n-k})$



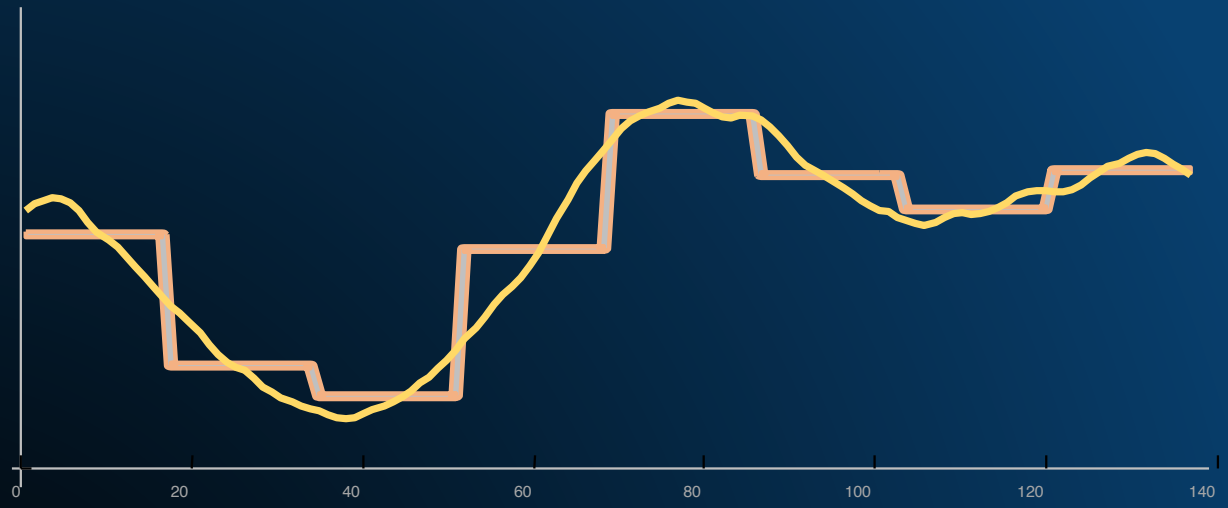
$w_i = x_i \ldots x_{i+k}$

Moving Average

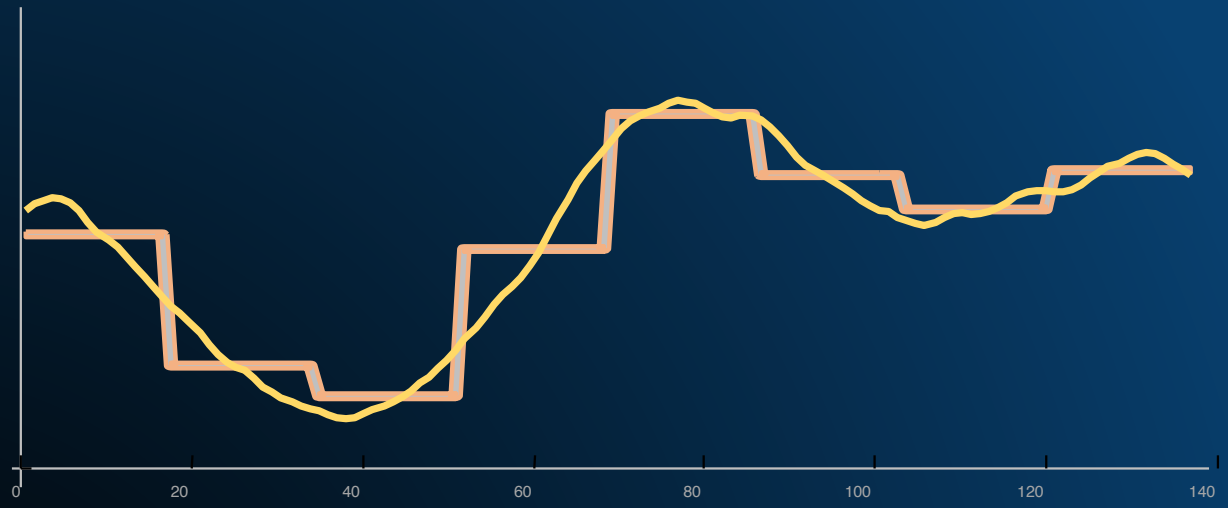
$X = x_1 x_2 \ldots x_n$ $\quad X' = avg(w_1)avg(w_2)\ldots avg(w_{n-k})$



Segmentation

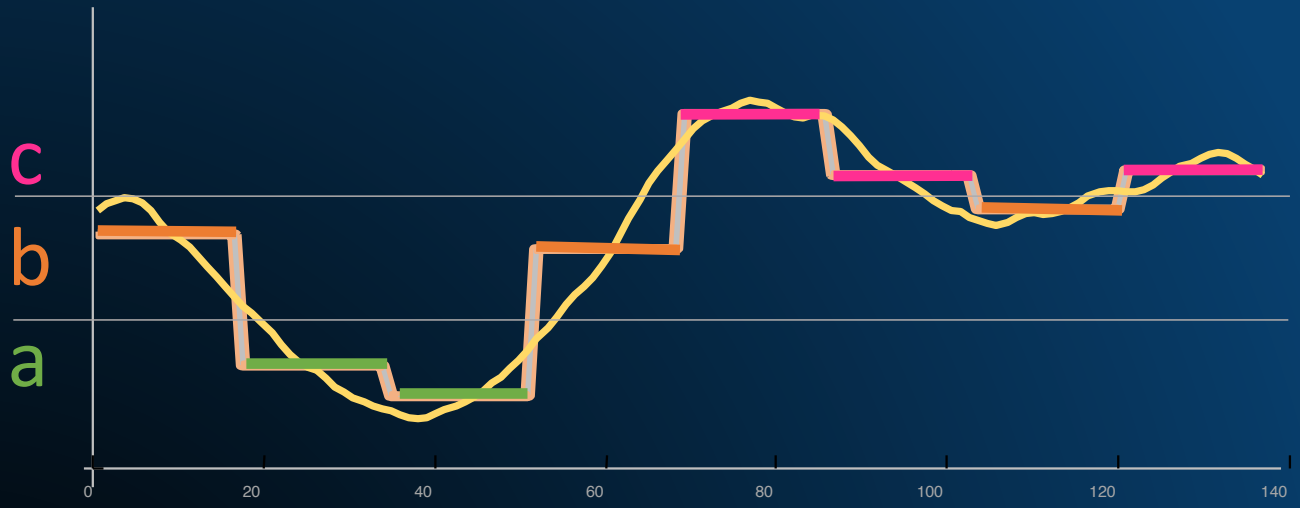


Piecewise Aggregate Approximation



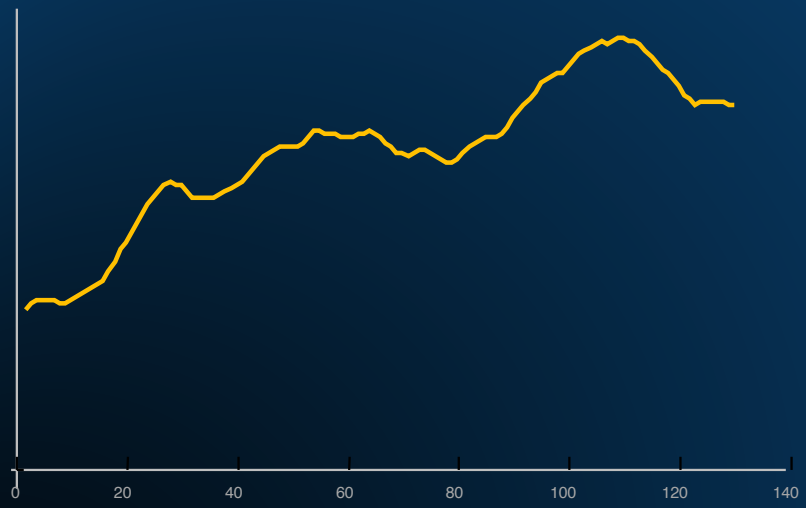
$$\bar{x}_i = \frac{N}{n} \sum_{j=\frac{n}{N}(i-1)+1}^{\frac{n}{N}i} x_j$$

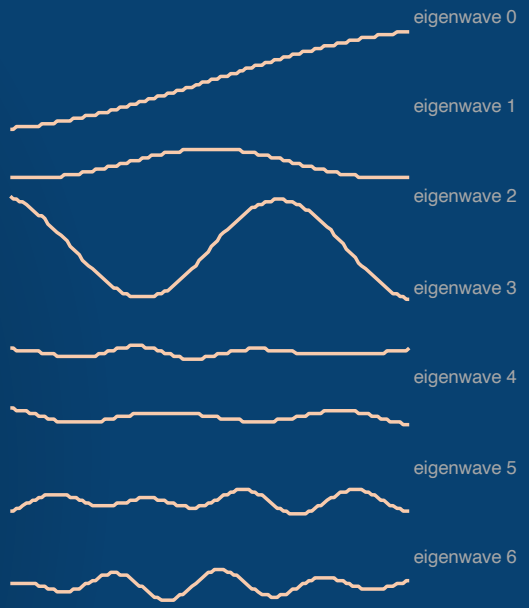
SAX – Symbolic Aggregation Approx



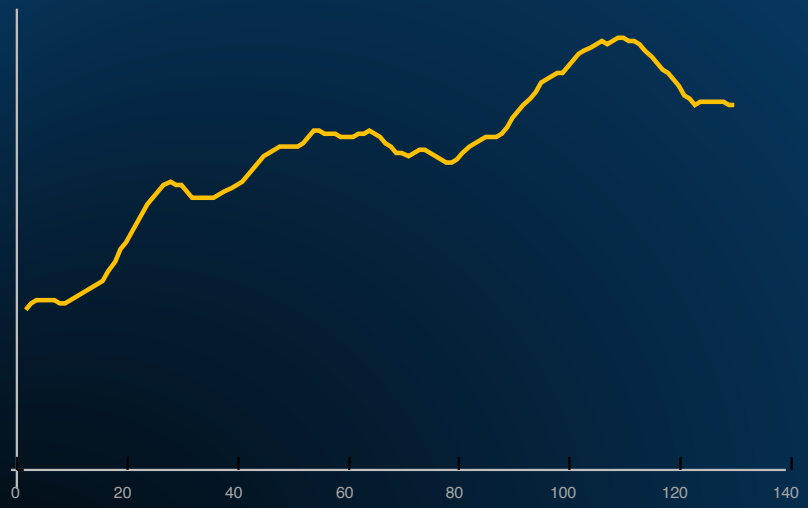
baabccbc

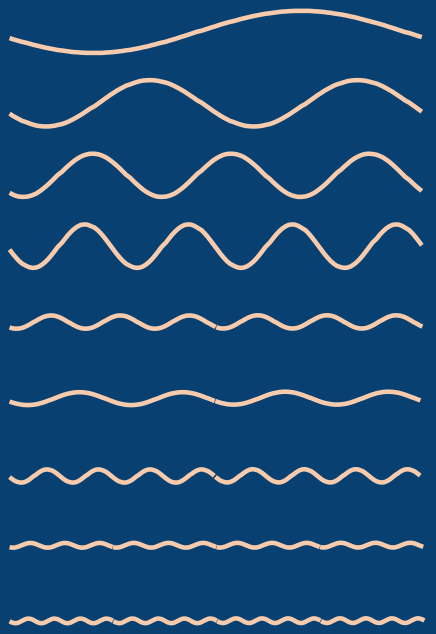
Singular Value Decomposition





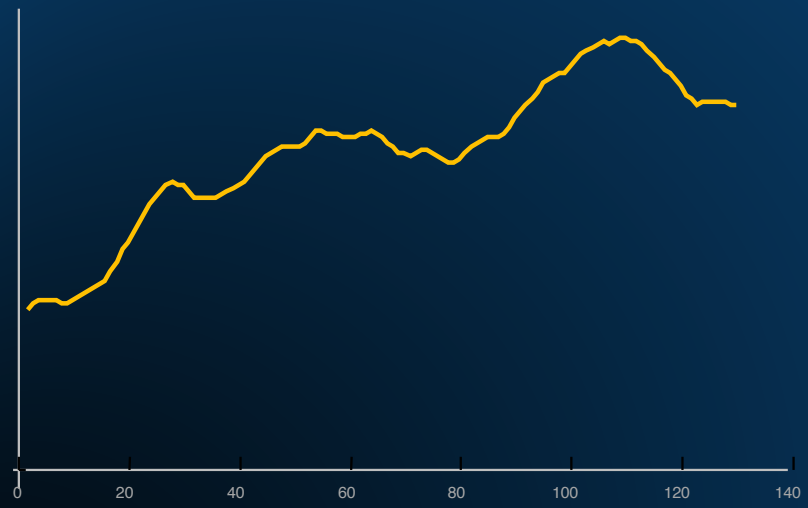
Discrete Fourier Transform

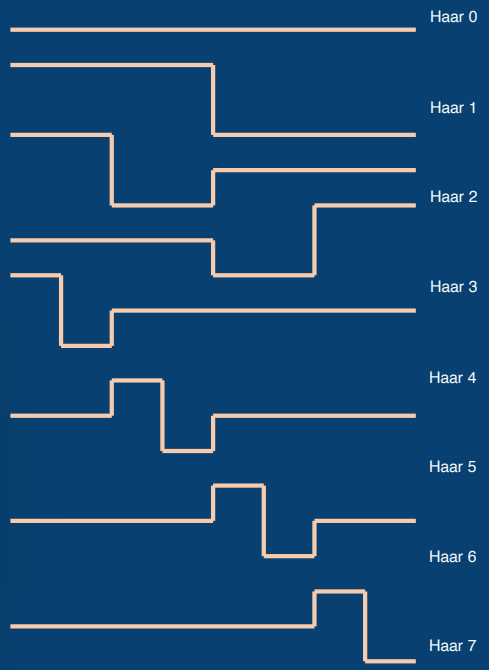




$$C(t) = \sum_{k=1}^{n} (A_k \cos(2\pi w_k t) + B_k \sin(2\pi w_k t))$$

Discrete Wavelet Transform





Thank you!