Smoothing

symmetric Moving average smoother.

$$m_t = \sum_{j=-k}^{k} a_j x_{t-j}$$

where $a_j = a_{-j} \geq 0$ & $\sum_{j=-j}^{j} a_j = 1$

Kernel smoother

a form of moving avg smoother that specifies weights in a particular way.

$$m_t = \sum_{i=1}^{n} w_i(t)\, x_i$$

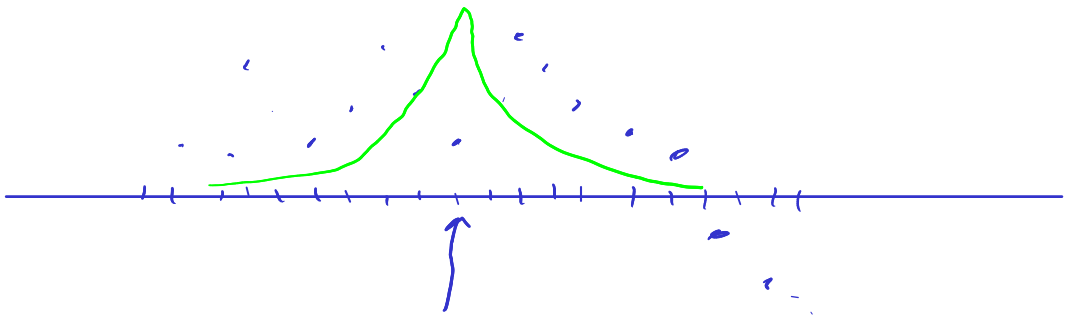
where $w_i(t) = K\left(\frac{t-i}{b}\right) \Big/ \sum_{j=1}^{n} K\left(\frac{t-j}{b}\right)$.

$K(\cdot)$ is referred to as the **kernel function**.

A common choice is the normal kernel,

$$K(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{z^2}{2}\right)$$

b is referred to as the **bandwidth**



Lowess smoother

Uses k-nearest neighbour regression.

that is, use $\{x_{t-k/2}, \ldots, x_t, \ldots, x_{t+k/2}\}$

to predict $\hat{x}_t$ by regression and set

$$m_t = \hat{x}_t$$

Smoothing splines