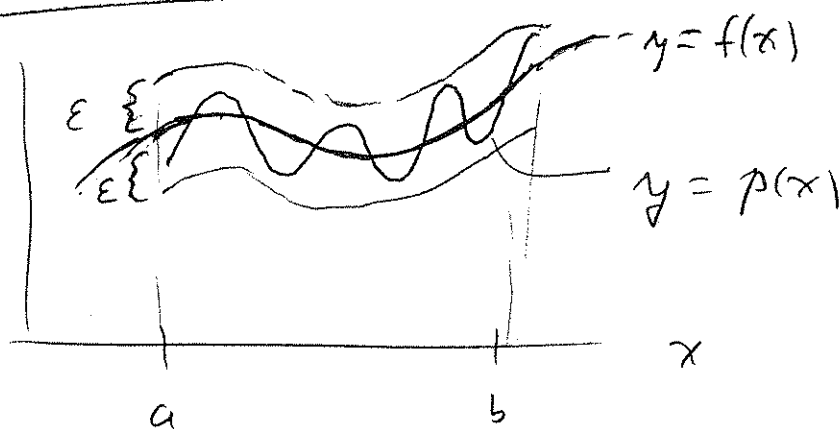


Weierstrass Approximation Theorem

If $f(x)$ is continuous on $[a, b]$, then for any $\varepsilon > 0$ there is a polynomial $p(x)$ such that

$$\max_{x \in [a, b]} |f(x) - p(x)| < \varepsilon$$

picture



Note that the degree of $p(x)$ probably increases as $\varepsilon \rightarrow 0$.

Also note that the "best" $p(x)$ for a given n interpolates $f(x)$, otherwise we could find a "better" $p(x)$ just by adding a constant c to $p(x)$.

We just don't know at what x_i $p(x)$ should interpolate $f(x)$ for a "best fit" of given degree.

