

- Bisection  $\epsilon_{n+1} \sim \frac{1}{2} \epsilon_n$
- Newton  $\epsilon_{n+1} \leq C \epsilon_n^2$
- Secant  $|\epsilon_{n+2}| \leq C |\epsilon_{n+1}| |\epsilon_n|$

Assume  $|\epsilon_{n+1}| \leq C |\epsilon_n|^p$  for some  $p$ .

$$|\epsilon_{n+2}| \leq C |\epsilon_{n+1}|^p \\ \leq C' |\epsilon_n|^{p^2}$$

$$\Rightarrow |\epsilon_n|^{p^2} \leq C'' |\epsilon_n|^p |\epsilon_n|$$

$$p^2 = p + 1 \Rightarrow p = \frac{1+\sqrt{5}}{2} \approx 1.618...$$

Golden ratio.