

3.1 Obliczamy

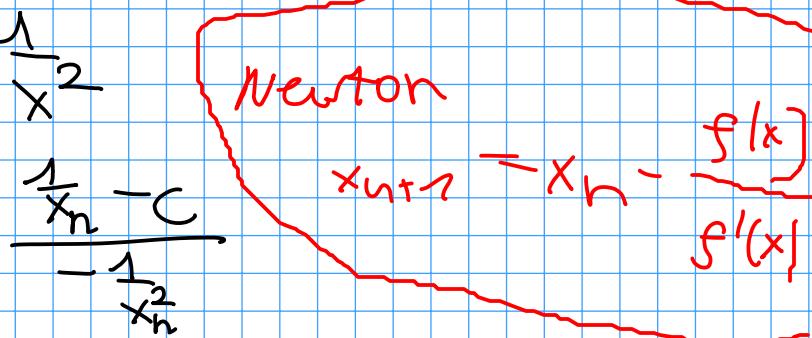
$$\frac{1}{c}$$

$$\frac{1}{c} = \alpha$$

$$f(x) = \frac{1}{x} - c$$

$$f'(x) = -\frac{1}{x^2}$$

$$x_{n+1} = x_n -$$



$$x_{n+1} = x_n + (x_n - x_n^2 c)$$

$$x_{n+1} = 2x_n - x_n^2 c = \underline{x_n(2 - x_n c)}$$

$$\underline{\underline{E}}(x_n) = x_n(2 - x_n c)$$

Zbiornik, gdy $|E'(n)| < 1$

$$E'(x) = 2 - 2x c$$

$$|E'(n)| < 1$$

$$|2 - 2n c| < 1$$

$$1 - nc < \frac{1}{2} \quad 1 - nc > -\frac{1}{2}$$

$$nc > \frac{1}{2}$$

$$nc < \frac{3}{2}$$

$$1^{\circ} \quad c > 0 \quad \text{unstetig}$$

$$\frac{1}{2c} < \frac{3}{2}$$

$$1 < 3 \quad \checkmark$$

$$n > \frac{1}{2c} \quad \wedge \quad n < \frac{3}{2c} \Rightarrow n \in \left(\frac{1}{2c}; \frac{3}{2c} \right)$$

$$2^{\circ} \quad c < 0$$

$$n < \frac{1}{2c} \quad \wedge \quad n > \frac{3}{2c}$$

unstetig

$$\frac{1}{2c} > \frac{3}{2c} \quad /2c$$

$$1 < 3$$

$$n \in \left(\frac{3}{2c}; \frac{1}{2c} \right)$$

$$1^{\circ} \quad 2^{\circ} \Rightarrow n \in \text{interv} \left(\frac{1}{2c}; \frac{3}{2c} \right)$$

niec metode te just zbiezne na obszane

$$\text{interv} \left(\frac{1}{2c}; \frac{3}{2c} \right)$$

wier $|\Phi'(n)| < 1 \iff n \in \text{interv} \left(\frac{1}{2c}; \frac{3}{2c} \right)$

$$e_n = x_n - \lambda$$

$$e_{n+1} = x_{n+1} - \lambda = \underline{\Phi}(x_n) - \underline{\Phi}(\lambda)$$

$$e_{n+1} = \underline{\Phi}(x_n) - \underline{\Phi}(\lambda) = \underbrace{\underline{\Phi}'(n)}_{\underline{\Phi}'(n)(x_n - \lambda)}(x_n - \lambda)$$

$$\overline{e_{n+1}} = \overline{\underline{\Phi}'(n)} e_n$$

Skoro $|\underline{\Phi}'(n)| < 1$

$$\boxed{\lambda = \frac{1}{c}}$$

to $e_n \rightarrow 0$ wier $x_n \rightarrow \lambda$

• λ weźmiemy dowolne $x_0 \in \text{interv} \left(\frac{1}{2c}; \frac{3}{2c} \right) = \text{interv} \left(\frac{1}{2}; \frac{3}{2} \right)$

to każde kolejne $x_i \rightarrow \lambda$ oraz będzie coraz

bliziej λ nie ma wyjednania z przedziału.