granice błędów

a_n, b_n, c_n wyliczone w ntym kroku a, b, c.

wtedy
$$b_{n+1} - a_{n+1} = \tfrac{1}{2}(b_n - a_n), \qquad n \geq 1$$

$$b_n - a_n = \frac{1}{2^{n-1}}(b - a), \qquad n \geq 1$$

Czyli
$$|\alpha - c_n| \leq c_n - a_n = b_n - c_n = \tfrac{1}{2}(b_n - a_n)$$

Więc
$$|\alpha - c_n| \leq \frac{1}{2^n}(b-a)$$

Załóżmy $|\alpha - c_n| \leq \varepsilon$ (żądanie)

Czyli
$$\frac{1}{2^n}(b-a) \leq \varepsilon$$

tj.
$$n \geq \frac{\ln \frac{b-a}{\varepsilon}}{\ln 2}$$

Niech $\varepsilon = 0{,}01$

$$n \geq \frac{\ln\left(\frac{1}{0{,}01}\right)}{\ln 2} = 9{,}97$$