$$\text{diff}_n = \frac{b-a}{2^n} \lesssim TOL \implies \frac{2-1}{2^N} \lesssim 0.0001$$

$$\implies 2^{-N} \lesssim 10^{-4} \implies -N \log_{10} 2 \lesssim -4$$

(+) Robust, always converges ✓

(−) Very slow ✓

$$f(x) = x^3 + 4x^2 - 10$$

$$[a,b] = [1,2]$$

$$f(1) = -5, \quad f(2) = 14$$

$$f(1)f(2) < 0$$

$$-N \log_{10} 2 \lesssim -4$$
$$\implies N \log 2 \gtrsim 4$$
$$\implies N \gtrsim \frac{4}{\log_{10} 2}$$
$$\implies \boxed{N \gtrsim 13}$$

n	a_n	b_n	P_n	$\text{diff} = \frac{b_n - a_n}{2}$	
0	1	2	1.5	$\frac{1}{2}$ 0.5	
1	1	1.5	1.25	$\frac{1}{2^2}$ 0.25	
2	1.25	1.5	1.375	0.125 → $\frac{1}{2^3}$	
3	1.25	1.375	1.3125	0.0625 → $\frac{1}{2^4}$	
⋮	⋮	⋮	⋮	⋮	
⋮	⋮	⋮	⋮	⋮	$\frac{1}{2^n}$