

Secant Method

input : function f , initial guesses x_{-1} and x_0 , tolerance ε_s ,
maximum iterations N

output: estimate x_r of the root

$x_{\text{prev}} \leftarrow x_{-1}; \quad x_r \leftarrow x_0$

for $i \leftarrow 1$ **to** N **do**

$x_{r,\text{old}} \leftarrow x_r$

$x_r \leftarrow x_{r,\text{old}} - \frac{f(x_{r,\text{old}})(x_{\text{prev}} - x_{r,\text{old}})}{f(x_{\text{prev}}) - f(x_{r,\text{old}})}$

$x_{\text{prev}} \leftarrow x_{r,\text{old}}$

$\varepsilon_a \leftarrow \left| \frac{x_r - x_{r,\text{old}}}{x_r} \right| \cdot 100\%$

if $\varepsilon_a < \varepsilon_s$ **then**

return x_r

end

end

return x_r // did not converge in N iterations