

Newton-Raphson

input : function f and its derivative f' , initial guess x_0 ,
tolerance ε_s , maximum iterations N

output: estimate x_r of the root

$x_r \leftarrow x_0$

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

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

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

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

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

return x_r

end

end

return x_r // did not converge in N iterations