

IFoS-2016 → Paper II

- 5) (C) Develop an algorithm for Newton-Raphson method to solve $\phi(x) = 0$ starting with initial iterate x_0 , n be the number of iterations allowed, ϵ be the prescribed relative error and δ be the prescribed lower bound for $\phi'(x)$.

⇒ Algorithm ⇒

- step 1: start.
- step 2: read x_0, ϵ, n, δ
- step 3: for $i = 1$ to n .
- step 4: $\phi_0 \leftarrow \phi(x_0)$
- step 5: $\phi'_0 \leftarrow \phi'(x_0)$
- step 6: if $|\phi'_0| < \delta$ then goto 12.
- step 7: $x_1 \leftarrow x_0 - (\phi_0 / \phi'_0)$
- step 8: if $|(x_1 - x_0) / x_1| < \epsilon$ then goto 14
- step 9: $x_0 \leftarrow x_1$
- step 10: write "Does not Converge in n iteration"
- step 11: stop
- step 12: write "slope too small", x_0, f_0, f'_0, i
- step 13: stop
- step 14: write Convergent solution", $x_1, f(x_1), i$
- step 15: stop