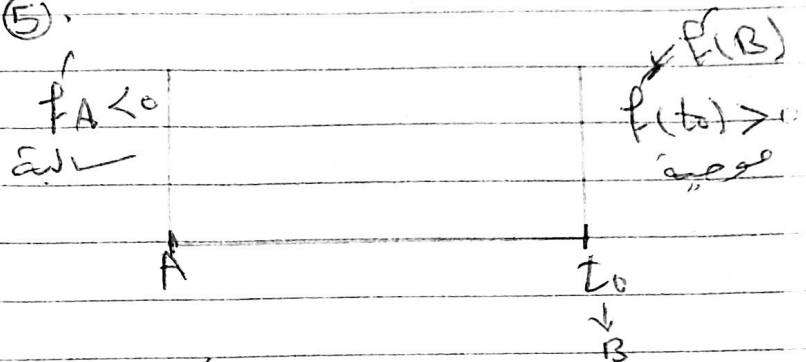


The basic steps of cubic interpolation method are:-

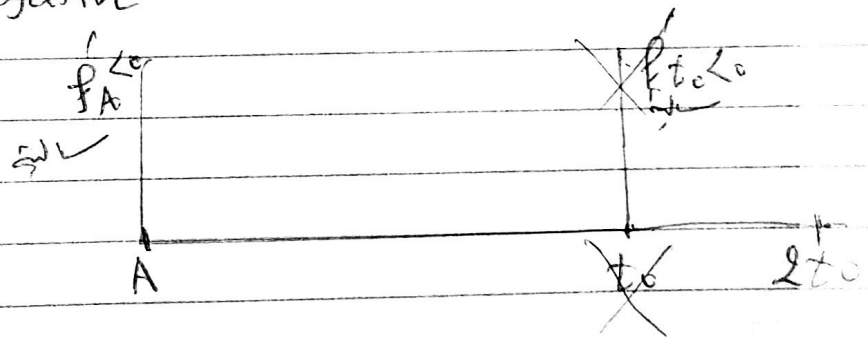
1- Let A initial Point and the initial step size t_0 .

2- Evaluate f'_A and f'_{t_0}

3- If $f'_A < 0$ and $f'_{t_0} > 0$, then $t_0 = B$ and go to step ⑤.



4- If $f'_A < 0$ and $f'_{t_0} < 0$, then point B can be taken as $t_0, 2t_0, 4t_0, 8t_0, \dots$ at which f'_B is nonnegative.



5- Find

$$x = A + \frac{f'_A + Z \pm Q}{f'_A + f'_B + 2Z} (B - A)$$

$$Q = \sqrt{Z^2 - f'_A f'_B}$$

$$Z = \frac{3(f_A - f_B)}{B - A} + f_A + f_B$$

6- If $|f(\tilde{x})| \leq \epsilon$ stop. Otherwise go to next step.

7- If $f(\tilde{x}) < 0$, the new Points A and B are taken as $\tilde{x}$ and B respectively and go to step (5).

$$A < \tilde{x} < B$$

$$f_A < 0$$

$$f(\tilde{x}) < 0$$

$$f_B > 0$$

~~A~~ ~~xxx~~

$\tilde{x}$
↓
A

B
↓
B

8- If $f(\tilde{x}) > 0$, the new Points A and B are taken as A and $\tilde{x}$ and go to step (5).

$$A < \tilde{x} < B$$

$$f_A < 0$$

$$f(\tilde{x}) > 0$$

$$f(B) > 0$$

A
↓
A

$\tilde{x}$
↓
B

~~xxx~~
~~B~~