$$f_2^- = f(\lambda_2 - \Delta\lambda) = f(1.55 - 0.01)$$
$$= f(1.54) = 2(1.54) - \frac{16}{1.54}$$
$$= 15.1328$$

$$\left| \frac{f_2^+ - f_2^-}{2\Delta\lambda} \right| \leq \epsilon$$

$$\left| \frac{15.1236 - 15.1328}{0.02} \right| = 0.46 > \epsilon$$

9- Secant method:

The secant method uses the following equation:-

$$f'(\lambda) = f'(\lambda_i) - S(\lambda - \lambda_i) = 0 \quad \text{——} (1)$$

where S is the slope of the line connecting the two point $(A, f'(A))$ and $(B, f'(B))$ where A and B denote two different approximations to the correct solution, λ^*. The slope S can be expressed as:-

$$S = \frac{f'(B) - f'(A)}{B - A} \quad \text{——} (2)$$

equation (1) approximates the function $f'(\lambda)$ between A and B as a linear equation (secant), and hence the solution of eq(1) gives the new approximation to the root of $f'(\lambda)$ as:-

$$\lambda_{i+1} = \lambda_i - \frac{f'(\lambda_i)}{S}$$

$$= A - \frac{f'(A)(B - A)}{f'(B) - f'(A)} \quad \text{——} (3)$$

The iterative process given be eq(3) is known as the Secant method.

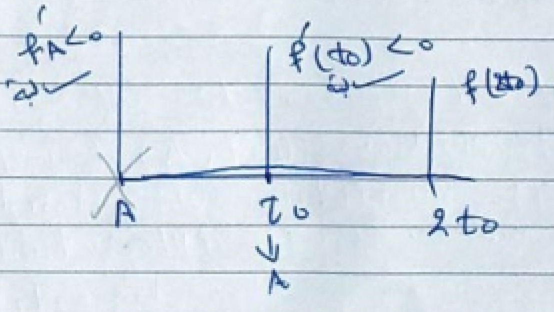
The iterative process can be implemented by using the following step by step procedure:-

1- Set $\lambda_0 = A = 0$ and initial step length t_0.

2- Evaluate $f'(A)$. The value of $f'(A)$ will be negative.

3- Evaluate $f'(t_0)$.

4- If $f'(t_0) < 0$, set $A = \lambda_i = t_0$, $f'(A) = f'(t_0)$ and new $t_0 = 2t_0$ and go to step(3)



5- If $f'(t_0) \geq 0$, set $B = t_0$, $f'(B) = f'(t_0)$ and go to step ⑥