

$$f(x) = e^{-0.5x} \times (4-x) - 2$$

$$\begin{aligned} f'(x) &= e^{-0.5x}(-1) - (4-x) \times 0.5 \\ &= e^{-0.5x} \times (1 + 0.5 \times (4-x)) \end{aligned}$$

Applying Newton Raphson iteration method
Using initial guess of $x = 0.5$,

$$x_{i+1} = x_i - (f(x_i) / f'(x_i))$$

$$x_{i+1} = \frac{0.5 - e^{-0.5(0.5)} \times (4 - 0.5) - 2}{e^{-0.5(0.5)} \times (3 - 0.5(0.5))}$$

$$= 0.838890606$$

$$x_{i+1} = 0.838890606 - \left[\frac{e^{-0.5(0.8388906)} \times (4 - 0.8388906) - 2}{e^{-0.5(0.8388906)} \times (3 - 0.5(0.8388906))} \right]$$

$$= 0.884956003$$

$$x_{i+1} = 0.884956003 - \left[\frac{e^{-0.5(0.884956003)} \times (4 - 0.884956003) - 2}{e^{-0.5(0.884956003)} \times (3 - 0.5(0.884956003))} \right]$$

$$= 0.8857080605$$

$$x_{i+1} = 0.8857080605 - \left[\frac{e^{-0.5(0.8857080605)} \times (4 - 0.8857080605) - 2}{e^{-0.5(0.8857080605)} \times (3 - 0.5(0.884956003))} \right]$$

$$= 0.885708802$$

Absolute error is given as

$$E_a = \left| \frac{x_{i+1} - x_i}{x_{i+1}} \right| \times 100$$

$$E_a = \left| \frac{0.838890606 - 0.5}{0.838890606} \right| \times 100 = 40.39747299$$

$$E_a = \left| \frac{0.884956003 - 0.838890606}{0.838890606} \right| \times 100 = 5.208388097$$

$$E_a = \left| \frac{0.885708605 - 0.884956003}{0.885708605} \right| \times 100 = 0.08497204337$$

$$E_a = \left| \frac{0.885708802 - 0.885708605}{0.885708802} \right| \times 100 = 2.224207319 \times 10^{-5}$$

$$E_a = \left| \frac{0.885708802 - 0.885708605}{0.885708802} \right| \times 100 = 0$$

i	x_{i+1}	E_a
0	0.5	
1	0.838890606	40.39747299
2	0.884956003	5.208388097
3	0.885708605	0.08497204337
4	0.885708802	2.224207×10^{-5}
5	0.885708802	0