

ASSIGNMENT II

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16/ENG 07/003

Petroleum Engineering

Soln

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

$$f'(x) = >$$

$$\text{let } u = e^{-0.5x} \quad ; \quad v = (4-x)$$

$$du = -0.5e^{-0.5x}, \quad dv = -1$$

$$f'(x) = -e^{-0.5x} - (4-x)0.5e^{-0.5}$$

$$x_0 = 0.5 \text{ \{ initial guess \}}$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$f(x_0) = f(0.5) = 0.7258027407$$

$$f'(x_0) = f'(0.5) = -2.141702153$$

$$\text{root 1} \Rightarrow x_1 = x_0 - \frac{f(x_0)}{f'(x_0)} = 0.8388906061$$

$$f(x_1) = 0.07814929779$$

$$f'(x_1) = -0.696486032$$

$$\text{root 2} \Rightarrow x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = 0.8849560003$$

$$f(x_2) = 1.236575203 \times 10^{-3}$$

$$f'(x_2) = -1.643060762$$

$$\text{root 3} \Rightarrow x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = 0.8857086005$$

$$f(x_3) = 2.2358557 \times 10^{-7}$$

$$f'(x_3) = -1.642200929$$

$$\text{root 4} \Rightarrow x_4 = x_3 - \frac{f(x_3)}{f'(x_3)} = 0.885708802$$

$$\therefore f(x_4) = 7.845 \times 10^{-12}$$

$$f'(x_4) = -1.642200704$$

$$\text{root 5} \Rightarrow x_5 = x_4 - \frac{f(x_4)}{f'(x_4)} = 0.885708802$$

$\therefore 0.885708802$ is the root of eqn (1.1)