

LAWAL SHERIFF-0

16/ENG 03/037

CIVIL-ENGR

ENG 382

ASSIGNMENT 2.

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

$$x_0 = 0.5$$

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

$$f'(x_i)$$

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

$$u = e^{-0.5x}$$

$$v = 4-x$$

$$\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$f'(x) = e^{-0.5x} (-1) + (-0.5e^{-0.5x} (4-x))$$

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

$$x_0 = 0.5$$

$$f(x_0) = e^{-0.5(0.5)} (4-0.5) - 2$$

$$f(x_0) = 0.7258027$$

$$f'(x_0) = -e^{-0.5(0.5)} - 0.5e^{-0.5(0.5)} (4-0.5)$$

$$f'(x_0) = -2.1417022$$

$$x_1 = 0.5 - \frac{0.7258027}{-2.1417022}$$

$$x_1 = 0.83889058$$

$$x_1 = 0.83889058$$

$$f(x_1) = e^{-0.5(0.83889058)} (4-0.83889058) - 2$$

$$f(x_1) = 0.07814934$$

$$f'(x_1) = -e^{-0.5(0.83889058)} - 0.5e^{-0.5(0.83889058)} (4-0.83889058)$$

$$f'(x_1) = -1.6764861$$

$$x_2 = 0.83889058 - \frac{0.07814934}{-1.6764861}$$

$$x_2 = 0.8849560$$

$$f(x_2) = e^{-0.5(0.8849560)} (4 - 0.8849560) - 2$$

$f(x_2) = 0.001236579$

$$f'(x_2) = -e^{-0.5(0.884956)} - 0.5e^{-0.5(0.884956)}(4 - 0.884956)$$

$$f'(x_2) = -1.643061$$

$$x_3 = 0.8849560 - \frac{0.001236579}{-1.643061}$$

$$x_3 = 0.88570861$$

$$f(x_3) = e^{-0.5(0.88570861)} (4 - 0.88570861) - 2$$

$$f(x_3) = 3.204469 \times 10^{-7}$$

$$f'(x_3) = -e^{-0.5(0.78570861)} - 0.5e^{-0.5(0.78570861)} \quad (2) - 0.78570861$$

$$f'(x_3) = -1.642201$$

$$x_4 = 0.88510261 - \frac{3.204469 \times 10^{-7}}{-1.642201}$$

$$x_1 = 0.8857088051$$

$$f(x_4) = e^{-0.5(0.8857088051)} (4 - 0.8857088051) - 2$$

$$f(x_4) = -5.082976 \times 10^{-9}$$

$$f'(x_4) = -e^{-0.5(0-0.8857077051)} - 0.5e^{-0.5(0-0.8857077051)}(4-0.8857077051)$$

$$f'(x_4) = -1.643164224$$

$$I_5 = 0.8857078051 - \frac{5.022976110^{-9}}{-1.643164224}$$

$$x_5 = 0.885708802$$

MATLAB

$$\text{Function}[x_1, \text{err}, \text{defect}] = 0.552 (x_0, \max, \text{tol}, \text{iter}, f_0, f_{\text{primitiv}})$$
$$x_D = 0.5;$$

max 1 = 100,

tol = 0.0000000001.

iter = 1;

$$f = (x) (e^x) (e^{\exp(-0.5x)})^4 (4-x) - 2;$$
$$f_{\text{prime}} = (a)(x) (-\exp(-0.5^*x)) + ((-0.5^* \exp(-0.5^*x))^*(4-x));$$

for $i = 1$, max 1;

$$x_1 = x_0 - f_{\text{eval}}(f, x_0) / f_{\text{eval}}(f_{\text{print}}, x_0);$$

$err = abs(x_1 - x_0)$; $relar = abs(x_1 - x_0)/x_1$;

`fprintf("%2.0f %10.1f %10.1f %10.1f %10.1f %10.1f", iter, x0, x1, err, rder);`

$$x_0 = x_1, \text{ iter} = 1 + \text{iter};$$

If error \leq tol,

break

end

end