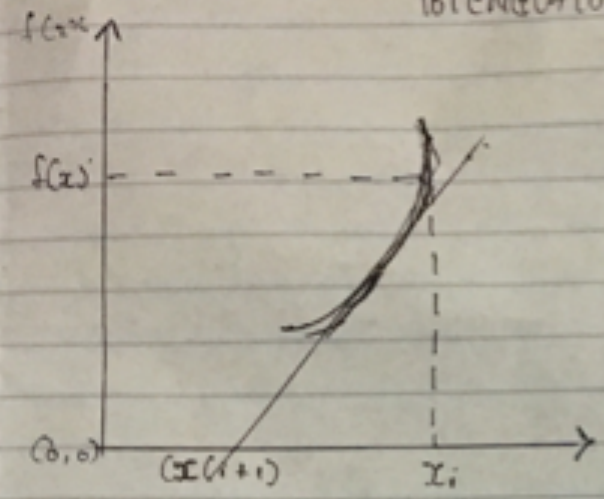
16/ENGG7001



$$f'(x') = \frac{f(x_i) - 0}{x_c - x_{(i+1)}}$$

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

$$f_1(x_i) \cdot (x_i) - f'(2)\, x_{2(i+1)} = f(x_i)$$

$$x_{(i+1)} = \frac{f'(x') \cdot \dot{x}(i) \cdot f(x)}{f'(x')}$$

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

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

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

$$f'(x) = -0.5 \times 4(e^{-0.5x}) - (x \cdot (0.5e^{0.5x}) + (e^{-0.5x} \cdot 1)) - 0$$

$$f'(x) = -0.5 \times 4 \cdot e^{-0.5x} - (-2e^{-0.5x} + xe^{-0.5x} + e^{-0.5x}) - 0$$

$$= -2e^{-0.5x} + xe^{-0.5x} - e^{-0.5x}$$

Therefore if $x_0 = 0.5$ as given

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

when $i = 0$

$$x_{(0+1)} = x_0 - \frac{f(x_0)}{f(x_0)}$$

$x_0 = 0.5$

$$x_1 = 0.5 - \frac{\left(e^{-0.5(0.5)}(4 - 0.5) - 2\right)}{\left(-2e^{-0.5(0.5)} + 0.5(0.5e^{-0.5(0.5)} - e^{-0.5(0.5)}\right)}$$

$$x = 0.5 - \left(\frac{0.225803}{-2.141022}\right) x' = 0.85514.$$

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e1(i+1) = abs(ev(i+1) - 5(i)) / (v(i+1) * 1)

if e*(i+1) <= 1e-11

break

end

end

tab = [1:10 (v'es']

tab =	This	1	e2
	0	0.5	0
	1	237.5	99.791
	2	294.17	18.736
	3	302.61	2.7895
	4	303.85	0.15796
	5	304.04	0.060153
	6	304.06	0.0088341
	7	304.07	0.0012944
	8	1	1
	9	11	11
	10	304.07	5.7635e-12
	11		
	12		

Converging at i = 2 to give V = 304.07

Hence the converging value of the iteration was seen as 304.07

Proof.

$$fp = \frac{0.3x^2}{500+(1nV)^3} - 0.02y$$

If = 304.02

Then fp = 7.8x3.5 = 34.3

$$= \frac{0.3 \times (304.07)^2}{500+(1n\,304.07)^3} - 0.02(304.07)$$

$$= 34.25 \approx 34.3$$

Assignment 1 16/ENG07/001

Adeshina Fegbotan John.

16/ENG07/001

Petroleum Engineering

1. $f_o = mxg$

$m = 3.5, g = 7.8$

$f_o = 3.5 \times 7.8$

$= 34.3$

Hence

$$34.3 = \frac{0.3v^2}{500 + (\ln v)^3} - 0.02v$$

$$34.3 = \frac{0.3v^2 - (500((\ln v)^3)(0.02v)}{500 + (\ln v^3)5}$$

$$17150 + (34.3(\ln v) = 0.3v^2 - (10v + 0.02v(\ln v)^3)$$

$$17150 + 34.3(\ln v)^3 = 0.3v^2 - 10v - 0.02v(\ln v)^3 = 0.3v^2$$

$$v^2 = \frac{17150}{0.3} + \frac{34.3}{0.3}(\ln v)^3 + \frac{10v}{0.3} + \frac{0.02v}{0.3}(\ln v)^3$$

$$v^2 = 57166.67 + 114.33(\ln v)^3 + 33.33v + 0.0667v(\ln v)^3$$

$$v = 57166.67 + 114.33(\ln v)^3 + 33.33v + 0.6662v(\ln v)^{\frac{1}{2}}$$

$$v_{o+1} = (57166.67 + 1143(\ln v)^3 + 33.33v + 0.667v(\ln v)^3)^{1/2}$$

Final equation

Matlab Code

Command window

Clear

Clc

format

v = 0.5;

for = 0:10and

other(i+1) = 1

v(i+1) = sqrt ((57166.67) + (114.33 * ((log(v(i))^3)) + (33.33v^2) + (0.0667 * v^3) + log(v(i)))^3)).