



TECNOLÓGICO DE ESTUDIOS SUPERIORES
DE ECATEPEC

División de ingeniería en Sistemas
Computacionales

“Examen 2do Parcial”

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Grupo: 5501

Ejercicio 2

~~$2x^3 - 11.7x^2 + 17.7x - 5$~~

Ejercicio 2 Método de la falsa posición $[0, 0.5]$
 5 iteraciones manuales y hacer el programa

$$x_r = x_u - \frac{f(x_u)(x_l - x_u)}{f(x_l) - f(x_u)} \quad x_l = 0 \quad x_u = 0.5$$

$$f(x_l) = 2(0)^3 - 11.7(0)^2 + 17.7(0) - 5 = -5 \quad \checkmark$$

$$f(x_u) = 2(0.5)^3 - 11.7(0.5)^2 + 17.7(0.5) - 5 = 1.2999$$

$$x_r = 0.5 - \frac{1.2999(0 - 0.5)}{-5 - 1.2999} = 0.3968$$

$$f(x_r) = 2(0.3968)^3 - 11.7(0.3968)^2 + 17.7(0.3968) - 5 = 0.3688 \quad \checkmark$$

$$x_l = 0 \quad x_u = 0.3968$$

$$f(x_l) = -5 \quad f(x_u) = 0.3688$$

$$x_r = 0.3968 - \frac{0.3688(0 - 0.3968)}{-5 - 0.3688} = 0.3695$$

$$f(x_r) = 2(0.3695)^3 - 11.7(0.3695)^2 + 17.7(0.3695) - 5 = 0.0947$$

$$x_l = 0 \quad x_u = 0.3695$$

$$f(x_l) = -5 \quad f(x_u) = 0.0947$$

$$x_r = 0.3695 - \frac{0.0947(0 - 0.3695)}{-5 - 0.0947} = 0.3626$$

$$f(x_r) = 2(0.3626)^3 - 11.7(0.3626)^2 + 17.7(0.3626) - 5 = 0.0236 \quad \checkmark$$

Continuación del ejercicio 2 y comienzo del ejercicio 3

$$\begin{aligned}
 & x_l = 0 \quad x_u = 0.3626 \\
 & f(x_l) = -5 \quad f(x_u) = 0.0236 \\
 & x_r = 0.3626 - \frac{0.0236(0 - 0.3626)}{-5 - 0.0236} = 0.3609 \\
 & f(x_r) = 2(0.3609)^3 - 11.7(0.3609)^2 + 17.7(0.3609) - 5 = 0.0058 \\
 \\
 & x_l = 0 \quad x_u = 0.3609 \\
 & f(x_l) = -5 \quad f(x_u) = 0.0058 \\
 & x_r = 0.3609 - \frac{0.0058(0 - 0.3609)}{-5 - 0.0058} = 0.0014 \\
 \\
 & \text{Ejercicio 3 Método de Newton Raphson} \quad x_0 = 3 \\
 & f(x) = 2x^3 - 11.7x^2 + 17.7x - 5 \\
 & f'(x) = 6x^2 - 23.4x + 17.7 \rightarrow (6 \cdot (x+2)) - (23.4 \cdot x) + 17.7 \\
 & x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)} \\
 \\
 & f(x_0) = 2(3)^3 - 11.7(3)^2 + 17.7(3) - 5 = -3.20 \\
 & f'(x_0) = 6(3)^2 - 23.4(3) + 17.7 = 1.50 \\
 & x_1 = 3 - \frac{-3.20}{1.50} = 5.1333 \\
 \\
 & f(x_1) = 2(5.1333)^3 - 11.7(5.1333)^2 + 17.7(5.1333) - 5 = 48.09 \\
 & f'(x_1) = 6(5.1333)^2 - 23.4(5.1333) + 17.7 = 55.6866 \\
 & x_2 = 5.1333 - \frac{48.09}{55.6866} = 4.2697
 \end{aligned}$$

$$x_3 = 4.2697$$

$$f(x_3) = 2(4.2697)^3 - 11.7(4.2697)^2 + 17.7(4.2697) - 5 = 12.9562$$

$$f'(x_3) = 6(4.2697)^2 - 23.4(4.2697) + 17.7 = 27.1724$$

$$x_4 = 4.2697 - \frac{12.9562}{27.1724} = 3.7929$$

$$x_4 = 3.7929$$

$$f(x_4) = 2(3.7929)^3 - 11.7(3.7929)^2 + 17.7(3.7929) - 5 = 2.9476$$

$$f'(x_4) = 6(3.7929)^2 - 23.4(3.7929) + 17.7 = 15.2634$$

$$x_5 = 3.7929 - \frac{2.9476}{15.2634} = 3.5999$$

$$x_5 = 3.5999$$

$$f(x_5) = 2(3.5999)^3 - 11.7(3.5999)^2 + 17.7(3.5999) - 5 = 0.3979$$

$$f'(x_5) = 6(3.5999)^2 - 23.4(3.5999) + 17.7 = 11.2164$$

$$x_6 = 3.5999 - \frac{0.3979}{11.2164} = 3.5643$$

Ejercicio 4

Ejercicio 3 Método de la secante $x_{-1} = 3$ $x_0 = 4$
3 iteraciones

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

$f(x_{i-1}) = 2(3)^2 - 11.7(3) + 17.7(3) - 5 = -3.2$

$f(x_i) = 2(4)^2 - 11.7(4) + 17.7(4) - 5 = 6.6000$

$x_1 = 4 - \frac{6.6000(3 - 4)}{-3.2 - 6.6000} = 3.3265$

$x_{i-1} = 4$ $x_i = 3.3265$

$f(x_{i-1}) = 6.6000$

$f(x_i) = 2(3.3265)^2 - 11.7(3.3265) + 17.7(3.3265) - 5 = -1.9688$

$x_2 = 3.3265 - \frac{-1.9688(4 - 3.3265)}{6.6000 - (-1.9688)} = 3.4812$

$x_{i-1} = 3.3265$ $x_i = 3.4812$

$f(x_{i-1}) = -1.9688$

$f(x_i) = 2(3.4812)^2 - 11.7(3.4812) + 17.7(3.4812) - 5 = -0.7959$

$x_3 = 3.4812 - \frac{-0.7959(3.3265 - 3.4812)}{-1.9688 - (-0.7959)} = 3.5862$

Ejercicio 1

$2x^3 - 11.7x^2 + 17.7x - 5$

Ejercicio 2 Método de punto fijo
5 iteraciones manuales

$$2x^3 - 11.7x^2 + 17.7x - 5 = 0$$

$$2x^3 = 11.7x^2 - 17.7x + 5 \quad | \quad -11.7x^2 = -2x^3 - 17.7x + 5$$

$$x^3 = \frac{11.7x^2 - 17.7x + 5}{2} \quad | \quad x^2 = \frac{-2x^3 - 17.7x + 5}{-11.7}$$

$$x = \sqrt{\frac{-2x^3 - 17.7x + 5}{-11.7}}$$

$$17.7x = -2x^3 + 11.7x^2 + 5$$

$$x = \frac{-2x^3 + 11.7x^2 + 5}{17.7}$$

$$\sqrt{\frac{11.7x^2 - 17.7x + 5}{2}} \rightarrow \left(\frac{(11.7(x^{k+2})) - (17.7(x^k) + 5)}{2} \right)^{\frac{1}{2}}$$

$$\sqrt{\frac{-2x^3 - 17.7x + 5}{-11.7}} \rightarrow \left(\frac{(-2(x^{k+3})) - (17.7(x^k) + 5)}{-11.7} \right)^{\frac{1}{2}}$$

$$\sqrt{\frac{-2x^3 + 11.7x^2 + 5}{17.7}} \rightarrow \left(\frac{(-2(x^{k+3})) + (11.7(x^{k+2})) + 5}{17.7} \right)^{\frac{1}{2}}$$

$$x_1 = \frac{-2x_{0.1} + 11.7x_{0.1}^2 + 5}{17.7}$$

$$- x_1 = \frac{-2(0)^3 + 11.7(0)^2 + 5}{17.7} = 0.282485$$

$$- x_2 = \frac{-2(0.282485)^3 + 11.7(0.282485)^2 + 5}{17.7} = 0.338626$$

$$x_2 = 0.338626$$

$$- x_3 = \frac{-2(0.338626)^3 + 11.7(0.338626)^2 + 5}{17.7} = 0.351486$$

$$x_3 = 0.351486$$

$$- x_4 = \frac{-2(0.351486)^3 + 11.7(0.351486)^2 + 5}{17.7} = 0.359443$$

$$x_4 = 0.359443$$

$$- x_5 = \frac{-2(0.359443)^3 + 11.7(0.359443)^2 + 5}{17.7} = 0.362555$$