TAREA III

Biseccion.

1. $F(x) = \frac{667.38}{x}(1 - e^{-0.146843x}) - 40$

Considera $[12, 16]$. Realiza 2 iteraciones

1. $p = \frac{12+16}{2} = 14$

$F_p = \frac{667.38}{14}(1 - e^{-0.146843(14)}) - 40 = 1.5687$

$F_A = 6.067$

$sgn(F_A) = sgn(F_p)$: $a = p$

2. $p = \frac{14+16}{2} = 15$

$F_A = 1.5687$

$F_p = -0.42483$

$sgn(F_A) != sgn(F_p)$: $b = p$

2. Raices de $f(x) = 5x^3 - 5x^2 + 6x - 2$, $[0,1]$, $e < 10\%$

1. $p = \frac{0+1}{2} = \frac{1}{2}$

$F_p = 5\left(\frac{1}{2}\right)^3 - 5\left(\frac{1}{2}\right)^2 + 6\left(\frac{1}{2}\right) - 2 = \frac{3}{8}$

$F_A = -2$

$sgn(F_A) != sgn(F_p)$: $b = p$

$\varepsilon = 100\%$

2. $p = \frac{0+\frac{1}{2}}{2} = \frac{1}{4}$

$F_p = -0.7344$

$F_A = -2$

$sgn = \Rightarrow a = p$

$\varepsilon = 100\%$

3. $\frac{\frac{1}{4}+\frac{1}{2}}{2} = \frac{3}{8}$

$F_p = -0.1894$

$F_A = -0.7344$

$sgn = \Rightarrow a = p$

$\varepsilon = 33.333\%$

4. $p = \frac{\frac{3}{8}+\frac{1}{2}}{2} = \frac{7}{16}$

$F_p = -0.0866699$

$F_A = -0.1894$

$sgn = \Rightarrow a = p$

$\varepsilon = 14.285\%$

5. $p = \frac{\frac{7}{16}+\frac{1}{2}}{2} = \frac{15}{32}$

$F_p = -0.052459$

$F_A = -0.0866699$

$\varepsilon = 7.69$

$\Rightarrow a = p$

Método de Newton-Raphson

3. $f(x) = x^{10} - 1$; $P_0 = 0.5$, $n = 5$

$f'(x) = 10x^9$

1. $0.5 - \frac{f(0.5)}{f'(0.5)}$

$P = 0.5 - \frac{(-0.999023)}{0.01953} = 51.653251$

$P_0 = P$

2. $P = 51.653251 - \frac{f(51...)}{f'(51...)} = 46.488202$

$P_0 = P$

3. $P = 46.48802 - \frac{f(46.488...)}{f'(46...)} = 41.839767$

$P_0 = P$

4. $P = 37.65506$

$P_0 = P$

5. $P = 33.88491$

4. Determina $f(x) = -x^2 + 1.8x + 2.5$; $P_0 =$

$f'(x) = -2x + 1.8$

1. $P = 5 - \frac{(-5^2 + 1.8(5) + 2.5)}{-2(5) + 1.8} = 5 - \frac{(-13.5)}{-8.2} = 3.35$

$\varepsilon = \left(1 - \frac{3.35365}{}\right) \times 100 = 99.09\%$

2. $P = 3.39 - \frac{(-2.7109)}{(-4.90)} = 2.8011$

$\varepsilon = \left(1 - \frac{2.809}{3.3902}\right) \cdot 100 = 19.716\%$

3. $P = 2.809 - \frac{(-0.30264)}{(-3.808)} = 2.7218$

$\varepsilon = \left(1 - \frac{2.7218}{2.8018}\right) \cdot 100\% = 3.1149\%$

4. $P = 2.7211 - \frac{(-0.0064)}{(-3.6422)} = 2.719341$

$\varepsilon = \left|\left(1 - \frac{2.7193}{2.7211}\right)\right| 100\% = 0.0064\%$

5. $P = 2.719341 - \frac{-3.6386}{(-3.122)} = 2.7193$

$\varepsilon = \left|\left(1 - \frac{2.7193}{2.7193}\right)\right| = 3.155\, e^{-5}$