Math330

Assignment #2 (Part 1)

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(Q1) Consider the equation $\cos(\ln(x-0.8))=0$. Solve this equation in $[1,2]$ using

(a) The bisection method. (b) The false-position method. (Find two iterations each).

(Q2) If we want to estimate the intersection point of $y=3x$ and $y=e^x$ on $[0,1]$ using three iterations of the bisection method, find the intersection point.

(Q3) If a function has a root in $[0.2,0.8]$, find the number of iterations of the bisection method needed to estimate this root with error of at most 6×3^{-8}.

(Q4) Consider the function $g(x)=\ln(4x+2)$.

(a) Show that $g(x)$ has a fixed point in the interval $[2,3]$.

(b) Show that the fixed point iterations of $g(x)$ converge for any p_0 in $[2,3]$.

(c) Using $p_0=2.4$, approximate the fixed point of $g(x)$ with error less than 10^{-2}.

(d) Using $p_0=2.4$, find the number of iterations to get accuracy of 5×10^{-6}.

(Q5) If we used the fixed point iteration $P_{n+1}=0.5e^{-P_n}$ on $[0,0.5]$, find the least number of iterations needed to estimate the fixed point with accuracy of 10^{-6}. Use $P_0=0.3$

(Q6) Find the fixed points of the function $g(x)=\frac{1}{2}x^2+\frac{1}{x}-\frac{1}{2}$, then classify them into repulsive or attractive.
