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Assignment # 6

Question # 1: [4 Marks] Use algebraic manipulation to show that each of the following functions has a fixed point at x precisely when $f(x) = 0$ where $f(x) = x^4 + 2x^2 - x \div 3$

1. $g_1(x) = \left(3 + x - 2x^2\right)^{1/4}$

2. $g_2(x) = \left(\frac{x+3-x^4}{2}\right)^{1/2}$

3. $g_3(x) = \left(\frac{x+3}{x^2+2}\right)^{1/2}$

4. $g_4(x) = \frac{3x^4 + 2x^2 + 3}{4x^3 + 4x - 1}$

Question # 2: [4 Marks] Perform four iterations on each of the functions g given in the previous question. Let $x_0 = 1$ and $x_{k+1} = g(x_k)$ for $k = 0, 1, 2, 3$ up to **5 decimal place** .

Question # 3: [2 Marks] Which function, $g(x)$ in the previous question, do you think gives the best approximation (Error Bound) after four iterations to the solution?

Question # 4 : Consider the function. $f(x) = x^3 + 4x^2 - x \div 4$

1. [2 Marks] State the roots of the function $f(x)$

2. [3 Marks] Construct three different fixed point function $g(x)$ such that $f(x) = 0$

3. [5 Marks] Find the convergence rate for $g(x)$ constructed in the previous part, and which root it is converging to?

Submission of the Assignment # 06:

- Solve all problems above.

- Prepare a title page including

Your Name, Your ID#, Theory Section #.

- Prepare a single .pdf or .jpg file containing the title page and the solution pages.

- To submit your assignment solution, visit the Submission Link (**Click here**). This will take you to a Google Form link.

- Fill up the Google Form link with correct information and upload the file there. You are done.

❮ Previous

Next ❯

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USIS

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