Numerical Analysis HomeWork 1

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1 Introduction to Fixed Point Iteration

If g is defined on [a, b] and g(p) = p for some p ∈ [a, b], then the function g is said to have the fixed point p in [a, b].

2 Section 2.2 Question 5

Use a fixed-point iteration method to determine a solution accurate to within 10^{-2} for $x^4 - 3 * x^2 - 3 = 0$ on $[1, 2]$. Use $p_0 = 1$.

2.1 Answer

$$x^4 - 3 * x^2 - 3 = 0 \tag{1}$$

$$x^4 = 3 * x^2 + 3 \tag{2}$$

$$x = (3 * x^2 + 3)^{\frac{1}{4}} \tag{3}$$

Results for 3.function with 10^-2 tolerance

step	p_0	p	$\lvert p_0 - p \rvert$
1	1.0000000	1.5650846	0.5650846
2	1.5650846	1.7935729	0.2284883
3	1.7935729	1.8859437	0.0923709
4	1.8859437	1.9228478	0.0369041
5	1.9228478	1.9375075	0.0146597
6	1.9375075	1.9433169	0.0058094

Result: $p_6 = 1.9433169$

**Theorically number of iteration:???