Homework Feedback 2

2010/10/18

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**P. 54 #13** Use Theorem 2.1 to find a bound for the number of iterations needed to achieve an approximation with accuracy 10^-4 to the solution of x^3 – x - 1 = 0

The answers in the submitted homework reports are correct: 14 iterations, the root 1.32477…

Typical error：

Two students compute the root of x^3 + x - 4 = 0 in problem #12

**P.54 #15** Let be the sequence defined by . Show that diverges even though .

The answers in the submitted homework reports are correct.

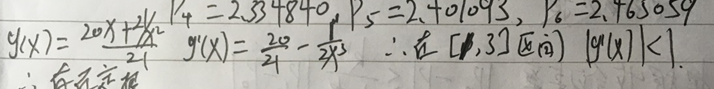
**P.64 #3** The following four methods are proposed to compute . Rank them in order. based on their apparent speed of convergence. assuming .

Answer: c does not converge. The convergence speed order: b>d>a.

Note: The theorem 2.3 is the sufficient condition but not the necessary condition of the fixed point convergence. You can also use the problem in P.64 #19 as an example.

Typical errors:

1. Only calculate the derivative of the fixed point iteration at .
2. There also exist errors in the derivation, for example:



**P.64 #19** a. Use Theorem 2.3 to show that the sequence defined by converges to whenever .

b. Use the fact that whenever to show that if , then

.

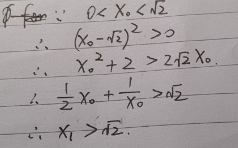
c. Use the results of parts (a) and (b) to show that the sequence in (a) converges to

whenever .

The answers in the submitted homework reports are correct.

Typical error:

1. There exists incorrect or indirect proof of (b). The proof is simple as shown in the following figures:



or

