

Homework Assignment for Week 04

Assigned Oct 05, 2010.

1. Section 2.2: Problems 2(b), 7, 12, 16, 24. Hand in part (a) of problem 12 by Oct 15.

2. The iteration $x^{n+1} = g(x^n)$ almost for sure does not converge when $|g'| > 1$ near the solution x^* . An easy remedy is to give a rough estimate on $g'(x^*)$, then perform the iteration

$$x^{n+1} = \alpha x^n + (1 - \alpha)g(x^n).$$

Show that this iteration, if convergent, gives a root to $x = g(x)$. The advantage of the new iteration is that, you can choose an α according to the approximate value of $g'(x^*)$, so that the new iteration converges. Apply this trick to the equation $x = g(x) = 1 - 2x + 0.2 \sin x$.

3. Section 2.3: Problems 17. Hand in by Oct 20.