Homework Assignment for Week 15

Assigned Dec 23, 2011.

1. Section 2.3: Problems 17(b,c).

2. Section 2.3: Problems 16, 19.

3. Show that the iteration $x_{n+1} = g(x_n)$ converges locally (that is, if x_0 is close enough to a solution) with cubic order ($\alpha = 3$ in Definition 2.6, page 75), provided $g'(x^*) = g''(x^*) = 0$ at a root x^*, $x^* = g(x^*)$. An application to solving $f(x) = 0$ is given in problem 13, section 2.4.

4. Section 2.4: Problems 8, 9, 10, 14.

5. Section 2.5: Problems 14, 15.

6. Find out $\hat{p}_n$ explicitly for Aitken's Δ^2 method for the following sequence: $a_n = 1/n$, $b_n = 1/n^2$, $c_n = \alpha^n$, $0 < \alpha < 1$ and $d_n = 2^{-2^n}$. Note the first two are linearly convergent sequence but does not satisfy the assumption of Theorem 2.13. The last one is a quadratically convergent sequence. Are the convergence accelerated in these cases?