MATH 5485 Introduction to Numerical Methods I

Instructor: *Alexander Shapeev* September 13, 2013

Quiz 1 (take-home)

due September 20, 2013

Remember to:

- Work on your own.
- Justify your answers (especially when the answer is "yes" or "no", or a single number).
- Provide details (e.g., how to derive a solution).
- Do NOT use red color for your answers.
- Write legibly, especially the answers (if hand-written).

Problem 1 (20pt). For a sequence $x_n = n\sin(1/n)$, compute the limit and determine the rate of convergence. (Hint: use the Taylor's expansion of $\sin x$ for $x \approx 0$.)

Problem 2 (10pt). For the following sequence,

n	p_n
0	7.10000
1	7.06641
2	7.03536
3	7.01354
4	7.00317
5	7.00036

find out numerically whether its order of convergence to 7 equals $\alpha = 1.5$. If yes then determine the asymptotic error constant λ.

Problem 3 (10pt). Sec. 1.3, Exercise 1(c).

Problem 4 (20pt). Sec. 1.3, Exercise 8.

Problem 5 (20pt). Sec. 1.3, Exercise 16.

Problem 6 (20pt). Sec. 1.4, Exercise 10.