Quiz 02

Oct 18, 2011.

1. Suppose that $M = N_1(h) + K_1h^2 + K_2h^4 + +K_3h^6 + \cdots$ and $N_1(h) = 1.570796$, $N_1(h/2) = 1.896119$, $N_1(h/4) = 1.974232$. Construct an extrapolation table and determine $N_3(h)$.

2. What is the rate of convergence of $N(h)$ if $N(h) = 0.486748$, $N(h/3) = 0.45788$ and $N(h/9) = 0.452324$?

3. Estimate h or n such that the composite Trapezoidal rule for $\int_1^2 \cos(x^2)dx$ has absolute error less than 10^{-5}. Then give your numerical value I_h with the n you obtained (program it and write down your answer).

4. Write down Simpson's formula for $\int_{-h}^{h} f(x)dx$. Need not derive or prove anything. If you don't remember and decide to derive, put on details.

5. A quadrature rule takes the form $\displaystyle\int_{-h}^{h} f(x)dx \approx 2h\left(\alpha_- f(\frac{-h}{2}) + \alpha_+ f(\frac{h}{2})\right)$. Find α_- and α_+ that gives the largest degree of precision. Then derive (prove) an error bound for the resulting scheme. (Need not give error identity)

Numerical Analysis I, Fall 2011 (http://www.math.nthu.edu.tw/~ wangwc/)

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