

## Quiz 06

Dec 31, 2010.

1. Find constants  $a$ ,  $b$ ,  $c$  and  $d$  so that the quadrature  $\int_{-1}^1 f(x)dx = af(-1) + bf(1) + cf'(-1) + df'(1)$  reaches maximal degree of precision.
2. Derive Gaussian quadrature for  $\int_{-1}^1 f(x)dx$  for the case  $n = 2$  (two nodes).
3. Find order of convergence of Midpoint rule applied directly (no subtraction of singular part, change of variable, etc) to the integral  $\int_0^1 x^{\frac{-1}{3}} dx$ . You can find the order either numerically or analytically. Give details.
4. Find 10 correct digits of  $\int_0^1 \frac{e^x}{\sqrt{x}} dx$ .
5. Estimate number of multiplications/divisions needed for the elimination part of Gauss elimination for an  $n \times n$  matrix. Give leading order with correct coefficient (i.e.  $Cn^p$ , find  $C$  and  $p$ ).

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