

Note from Henrik:

Newton-Cotes methods are easy to program, so I recommend that you implement your own program from scratch.

## Task for lecture 8

- Consider the following integrals.

$$\int_0^1 \cos(x^2)e^{-x}dx \quad (1)$$

$$\int_0^1 \sqrt{x} \cos(x^2)e^{-x}dx \quad (2)$$

$$\int_0^1 \frac{1}{\sqrt{x}} \cos(x^2)e^{-x}dx \quad (3)$$

$$\int_0^1 1000 \cdot e^{\left(\frac{-1}{x}\right)} \cdot e^{\left(\frac{-1}{1-x}\right)}dx \quad (4)$$

- Approximate eq. 1 using the *the midpoint(Rectangle) method*, the *trapezoidal method* and the *Simpson's method*.
- Approximate eq. 2 using the *the Simpson's method*.
- Approximate eq. 3 using the *the midpoint(Rectangle) method*
- Approximate eq. 4 using the *the trapezoidal method*.
- For each solution, apply *Richardson Extrapolation* to evaluate the order of the method and estimate the error.
- Print the data in tables similar to the one found in todays presentation.