

On 28/3, Dorte Sølvason started on Numerical Integration where the Newton-Cotes methods were presented, i.e. the

- Extended midpoint rule Eq. (4.1.19)
- Extended Trapezoidal rule Eq. (4.1.11)
- Extended Simpson's rule Eq. (4.1.13).

She then introduced Richardson extrapolation for estimating the order of a method based on a stepsize  $h$  and the related error on a numerical estimate. With Ole, you worked on using the methods on four different examples where you computed the results, used Richardson to estimate the order and the error on your results. Notice that the rectangle routine "Midpnt" on p. 168 uses  $\alpha=3$  rather than  $\alpha=2$ . Hence, if you use that method, remember to take this into account when doing Richardson estimates. The reason for setting  $\alpha=3$  is to be able to reuse more  $f$ -computations. Anyway, it is also recommended that you develop your own implementations.

On 4/4, we will discuss the error behavior a bit more, in particular the asymptotic expansions in Eq. 4.2.1 and 4.4.1. This forms the basis for handling integrations with singularities, and also the method outlined in Section 4.5. We will also briefly discuss generalizations to several dimensions. We will go through the presentation of the four examples from last week, and I will hand out and introduce a bit the next mandatory exercise.