On 19/3, we discussed solving multiple non-linear systems in multiple unknowns leading to Newton's method with backtracking.

On 26/3, we will start on numerical integration and look at the Newton-Cotes quadratures, i.e.

Extended midpoint rule Eq.(4.1.19)

Extended Trapezoidal rule Eq.(4.1.11)

Extended Simpson's rule Eq.(4.1.13).

We then introduce Richardson extrapolation for estimating the order of a method based on a stepsize h and the related error on a numerical estimate.

With Jens, you will work on using the methods on four different examples where you compute the results, and use Richardson to estimate the order and the error on your results.

I recommend that you program the method yourselves, but notice that if you use the NR routines, 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, as said, I recommend that you also develop your own implementations of the methods.