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TMA4122  
Matematikk 4M  
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**Exercise set 11**

In all problems you are supposed to show the details of your work and describe what you are doing.

- 1 Do 5 steps of the Euler method to solve the following system of ODE's

$$\begin{aligned}y_1' &= 2y_1 - 4y_2 \\ y_2' &= y_1 - 3y_2\end{aligned}$$

with  $y_1(0) = 3$ ,  $y_2(0) = 0$  and  $h = 0.1$ .

- 2 Do 2 steps of the Runge-Kutta method to solve the following system of ODE's

$$\begin{aligned}y_1' &= -3y_1 + y_2 \\ y_2' &= y_1 - 3y_2\end{aligned}$$

with  $y_1(0) = 2$ ,  $y_2(0) = 0$  and  $h = 0.1$ .

- 3 Do 2 steps of the Runge-Kutta method to solve the following second order ODE

$$y'' + \frac{1}{4}y = 0$$

with  $y(0) = 1$ ,  $y'(0) = 0$  and  $h = 0.2$ .