# TFY4240, Electromagnetic theory, fall 2015:
# Tutorial 1

**Problem 1.**

Do all the examples of chapter 2 of Griffiths. This is intended for helping you recapitulate what you already should know from previous classes.

**Problem 2.**

By using the index notation (and the Levi-Civita symbol) introduced in the lectures, show the following vector identities:

a) $\boldsymbol{A} \times (\boldsymbol{B} \times \boldsymbol{C}) = \boldsymbol{B}(\boldsymbol{A} \cdot \boldsymbol{C}) - \boldsymbol{C}(\boldsymbol{A} \cdot \boldsymbol{B})$

b) $\boldsymbol{\nabla} \cdot (\boldsymbol{\nabla} \times \boldsymbol{A}) = 0$

c) $\boldsymbol{\nabla} \times (\boldsymbol{\nabla} \psi) = 0$

d) $\boldsymbol{\nabla} \times (\boldsymbol{\nabla} \times \boldsymbol{A}) = \boldsymbol{\nabla}(\boldsymbol{\nabla} \cdot \boldsymbol{A}) - \nabla^2 \boldsymbol{A}$

e) $\boldsymbol{\nabla} \times \left( \dfrac{A}{g} \right) = \dfrac{g(\boldsymbol{\nabla} \times \boldsymbol{A}) + \boldsymbol{A} \times (\boldsymbol{\nabla} g)}{g^2}$