SR tutorial 1 (R. Bartolini)

The tutorials are based on the solution and discussion of the exam problems sets given in the last two years (see exam sheets on indico) and the further discussion of some of the formulae presented in the lectures.

Tutorial #1 is limited to the exam exercises dealing with general properties of synchrotron radiation covered in the lectures so far

exercise #2 #4 in the exam sheet of 2012

exercise #1 #2 #3 in the exam sheet of 2013

Additional exercise: prove the equivalence of the various expressions for the total power radiated by an electron in a bending magnet

$$P = \frac{e^2}{6\pi\varepsilon_0 c}\left|\dot{\vec{\beta}}\right|^2 \gamma^4 = \frac{e^2}{6\pi\varepsilon_0 c}\left|\dot{\vec{\beta}}\right|^2 \frac{E}{E_o^4}^4 = \frac{e^2}{6\pi\varepsilon_0 m^2 c^3}\left|\frac{d\vec{p}}{dt}\right|^2 \gamma^2 = \frac{e^2 c}{6\pi\varepsilon_0}\frac{\gamma^4}{\rho^2} = \frac{e^4}{6\pi\varepsilon_0 m^4 c^5} E^2 B^2$$