

## 42834 Planar Antennas for Wireless Systems Deliverable 2

Upload a pdf document with the solutions to the following questions in the section  
“Deliverables” of Campus Virtual. **Deadline: April 14<sup>th</sup>, 2024, 23:59 h.**

All the questions have the same weight.

1. Let it be a wire oriented along z-axis. The current distribution is constant in amplitude and linear in phase  $I(z) = I_0 e^{-j0.6\pi z/\lambda}$ ,  $|z| < 4\lambda$ . Which is the direction of maximum radiation?
2. Write the expressions of electric and magnetic radiated fields for an elementary dipole of length  $l$  located at  $(\lambda/2, \lambda/4, 0)$  oriented along y-axis. It is not necessary to derive every expression from scratch. You can use expressions that can be found in the slides as starting point.
3. For the dipole of the previous question, plot the E-plane and H-plane cuts of the radiation pattern in polar coordinates. Label all axes to make clear the orientation of the radiation pattern.
4. Use the definition of maximum directivity to obtain this value for a half-wave dipole. Hint: use the expressions of radiated fields and input impedance as starting point (slides).
5. Determine the input impedance for the half-wave dipole of the figure below. Hint: use theory image to build an equivalent problem in free space.

