

# Intuition and symmetries in electromagnetism: Eigen states of 4 antennas

Bilel HAMDI<sup>1</sup> and Taoufik Aguil<sup>2</sup>

<sup>1</sup>National Engineering School of Tunis

<sup>2</sup> National Engineering School of Tunis, B. P. 37

June 7, 2022

## Abstract

Symmetries play an essential role in the field of physics. In this paper, we examine the relationship between the eigen-amplitudes of 4 symmetrical antennas and the symmetry of the amplitudes of their sources (excitations) using mirroring effects. By exploiting the symmetry problem, we can show the advantage of reducing the size of the analysis domain, at least by a factor of two or more (2,4 and 8)(depending on the problem). Several simulation examples have been developed by the MoM-GEC and HFSS to validate this approach.

## Hosted file

IET\_Electronics\_Letters.pdf available at <https://authorea.com/users/487476/articles/571997-intuition-and-symmetries-in-electromagnetism-eigen-states-of-4-antennas>