Engineering Electromagnetics
Laboratory Exercise No. 4 – Moving Magnetic Fields

Objective

In this lab, you will use Maxwell's Transient Solver to model Faraday's Law. You will model a magnetic field moving through and around a coil to induce current within the coil.

1   Current Induced by Magnetic Field

1. Recreate the initial example found in the following tutorial under the section Transient - Translation Motion. Note you may need to reduce the region size to around 20 percent in all directions so Maxwell doesn't crash

2. http://www.mae.ncsu.edu/buckner/courses/mae535/Maxwell3D.pdf

3. Discuss the example's results

4. Repeat the example twice with the magnet outside of the coil at different distances. Keep the magnet perpendicular to the coil

5. Discuss the results at each distance using equations to help if needed

2   Design Your Own

You are to design your own Maxwell model to illustrate Faraday's Law. It can be anything you want, but be able to explain clearly what is happening within the model.

Laboratory Write-up

Content is more important than form. It is important that you explain your results. Handing in excellent data without explanations is not sufficient. There should be an introduction to the lab, figures of results, Maxwell code (if necessary; preferably in an appendix), an explanation for each figure, and a summary of what you learned in the exercise. If you want a specific format, consider using the IEEE style sets for transaction publications.