CHAPTER OVERVIEW

23: Electromagnetic Induction

Learning Objectives

- Understand how to apply Faraday's Law to determine an induced voltage.
- Understand how to model the induced voltage in a moving conductor.
- Understand how to model an electric generator.
- Understand how electromagnetic induction affects electric motors.
- Understand how to model electric transformers.
- Understand how electromagnetic waves are formed.

In this chapter, we introduce the tools to model the connection between the magnetic and the electric field. In particular, we will see how a changing magnetic field can be used to induce an electric current, which is the basic principle behind the electric generators that power our life. We will also briefly discuss how electromagnetic waves are formed.

prelude

How does one make electricity with a hydroelectric dam?

A. By running water through a coil to induce a current.
B. By using water to rotate a coil inside of a fixed magnetic field.
C. By using water to charge a metallic surface by friction, and then maintaining that potential difference.