

**Homework 1**

**Date set: Tuesday, September 7, 2021**

**Solution uploaded on the course website: Tuesday, September 14, 2021**

**Quiz Date: Thursday, September 16, 2021 (during class)**

**The quiz has one or more problems based on the assigned problems below**

**Reading (in addition to the handouts):**

Text: From Masters' 2<sup>nd</sup> edition

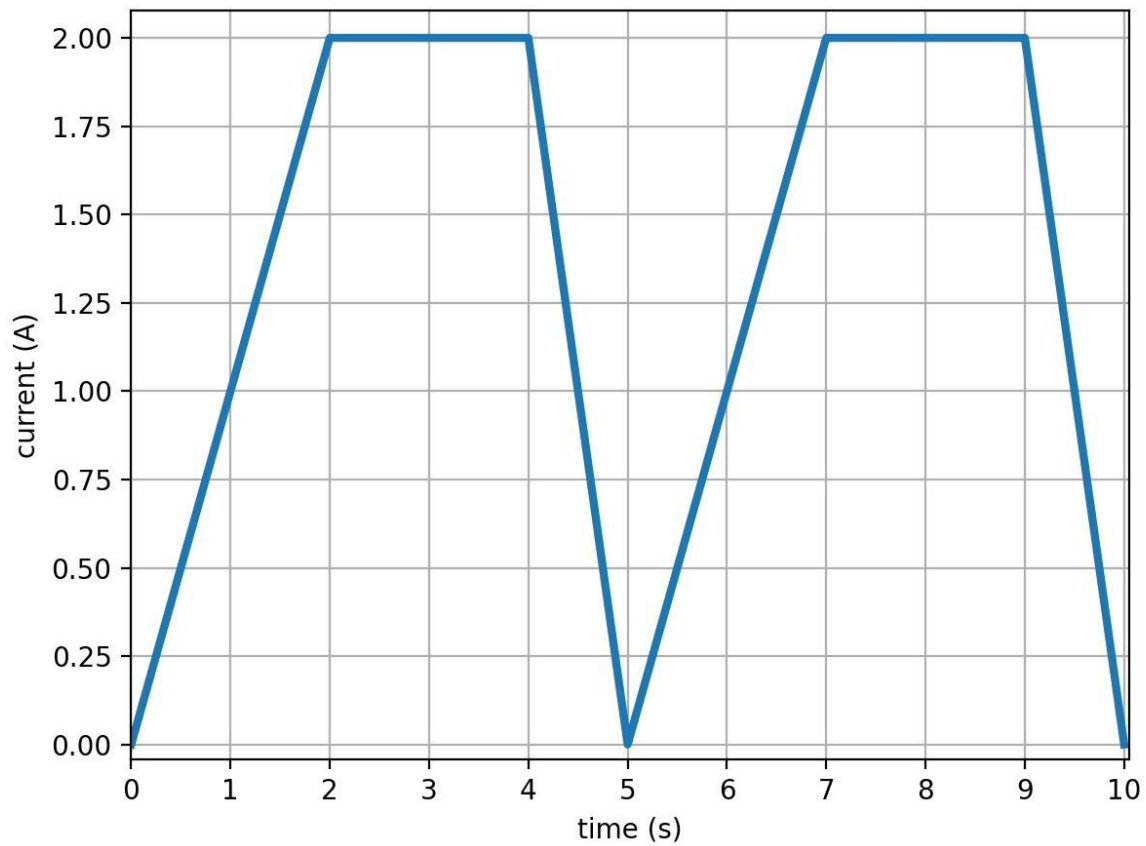
- chapter 1 (sections 1.1 through 1.4)
- chapter 3 (sections 3.1 through 3.5)

Problem 1: Provide the **meaning** and a **physical unit** for each of the following terms in the context of power and energy systems. For example, the term voltage refers to electric potential difference and is usually given in volts – Joules/Coulomb and  $V$  are acceptable units along with prefixed voltage units such as  $mV$  and  $kV$ .

- a) energy consumption
- b) *GDP*
- c) *GHG* emissions
- d) installed capacity
- e) *LCOE*
- f) base load

Problem 2: **Explain** the three main reasons behind the decline in US CO<sub>2</sub> emissions due to generation with respect to those in 2005. Your answer must include a discussion on electricity demand and resource mix.

Problem 3. **Provide** the mathematical expression for the current waveform shown below and **determine** its *r.m.s.* value. Show all your steps.



**Solve the following problems from Masters' 2<sup>nd</sup> edition:**

Text: 3.6, 3.10, 3.12, 3.16 (skip part b)