

Electromagnetics Course Reader

電磁學講義

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Forewords

This course reader is by no means a rigorous publication. It serves as a lecture note based upon the textbooks Field and Wave Electromagnetics by David K. Cheng and Fundamentals of Applied Electromagnetics by Fawwaz T. Ulaby. I intend to make the materials in this course more concise, easier to read, and better understood by undergraduate students. After informing the publishers, I extract or modify some pictures, graphs, and plots from the textbooks, and explain the physics with relevant mathematics and key concepts in their simplest possible forms. Some contents of this course reader are also adopted from the textbook, Fields and Waves in Communication Electronics (2nd Ed., John Wiley & Sons, 1984) by Simon Ramo, John R. Whinnery, and Theodore van Duzer.

This course reader has been evolved from the handouts of the courses Electromagnetics I and II that I taught at the Department of Nuclear Science, National Tsinghua University (NTHU), between Feb. 1997 and June 1999. In 2000, the first 7 chapters of this course material were again used for the course Electromagnetics I at the Department of Electrical Engineering (EE) of the same school. As the electromagnetic course at the NTHU EE Department has been changed to a one-semester course called Electromagnetics, I added Plane Electromagnetic Waves into this course reader since 2005 to make it a minimum required course material for undergraduate students in electrical engineering. In this course, I intend to emphasize concepts and physical pictures but not the mathematic skills. *Students are asked to work out the detailed calculations by themselves before and after the class.*

This course reader is not to be sold for profits. All the income of this reader, if any, will be donated to members of the NTHU Huang Lab for dinner parties, after-meeting snacks, or academic activities. Y.C. Huang thanks all his lab students who have been working extremely hard to build up an excellent photonics research group.



Yen-Chieh Huang, Sep. 15, 2020

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