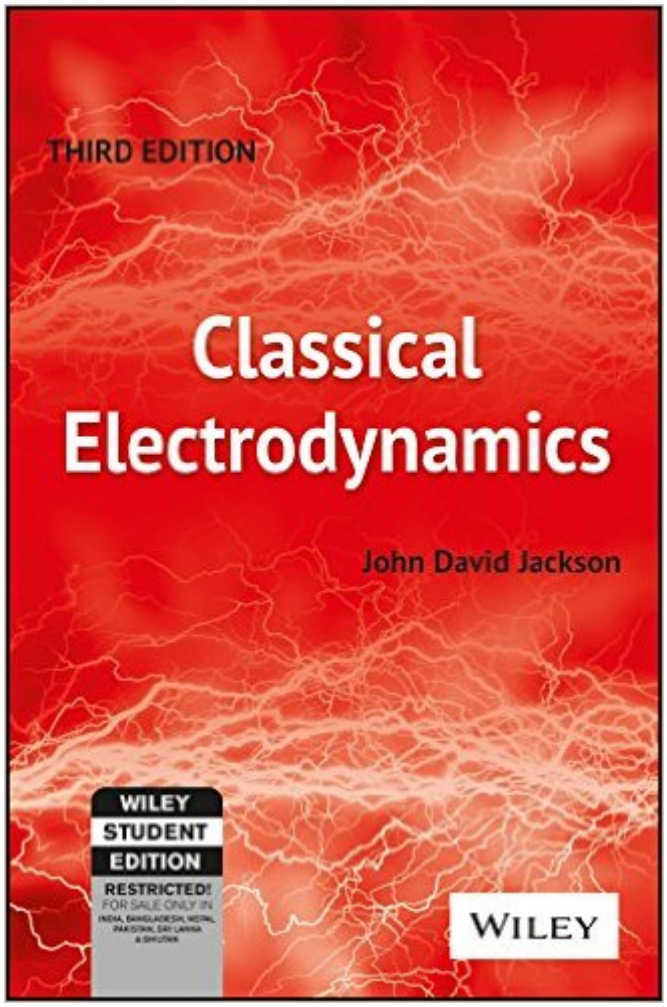
Classical Electrodynamics



Synopsis

This book covers information relating to physics and classical mathematics that is necessary to understand electromagnetic fields in materials and at surfaces and interfaces. Ã Â introduction to electrostatics Ã Â boundary-value problems in electrostatics: i Ã Â boundary-value problems in electrostatics: ii Ã Â multipoles, electrostatics of macroscopic media, dielectrics Ã Â magnetostatics, faraday's law, quasi-static fields Ã Â maxwell equations, macroscopic electromagnetism, conservation laws Ã Â plane electromagnetic waves and wave propagation Ã Â waveguides, resonant cavities, and optical fibers Ã Â radiating systems, multipole fields and radiation Ã Â scattering and diffraction Ã Â special theory of relativity Ã Â dynamics of relativistic particles and electromagnetic fields Ã Â collisions, energy loss, and scattering of charged particles, cherenkov and transition radiation Ã Â radiation by moving charges Ã Â bremsstrahlung, method of virtual quanta, radiative beta processes Ã Â radiation damping, classical models of charged particles

Book Information

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Customer Reviews

(...but I wish I could!!!)The title of my review just about sums my opinion on this "classic" grad electrodynamics text. The book kind of [stinks] as a textbook, but there is nothing even remotely close to it in scope out there.So like a previous reviewer said: "Jackson's here to stay; GET USED TO IT!!"...P>For those who still want my opinion on the specifics of this book (I promise, they won't help you-- you still have to get through Jackson!) I offer the following brief comments, some of which you may have heard before, some which may be new:(1) The problems are hard. Damn hard.

Someone else already said that, and I agree. What I WILL add, however, is that some of the problems are also simply STUPID and a waste of time, offering or enhancing physical understanding very little if at all. (Don't get me wrong-- there are some problems which, while hard, are also pretty darn cool. Unfortunately, there are too many of the other kind, too.) The type of problems I am talking about are of the following ilk: "Prove the following six-term vector identity;" "Re-derive equation #72 for a transverse magnetic field'" "Prove equation #27." Quite simply: WHO CARES!?!(2) While the volume is pretty encyclopedic, it is often hard to follow. Jackson often simply states things in the text without explaining where they come from, how they are derived, or why they are important,--- for example, as I read the text, I began to hate the two words "we see," which are used is cases like (paraphrasing now) "Therefore, we see the following relationship holds"---when it was not at all clear to me where the heck this relationship was coming from! I often felt stupid because, in fact, I often did NOT "see" at all!!!

I am currently taking the second semester of a full-year course in graduate electrodynamics. We've been using Jackson as our main textbook, but the professor sometimes use his own collection of problems as our homeworks. I've just realize why he did it, some of the problems in Jackson are extremely difficult.However, I agree with another reviewer who stated that once you are armed with full mathematical apparatus, the book would be a gold mine of electrodynamics. My own method of study involves derivations of formulas, following the discussion in Jackson. This is really hardwork, but it worth the effort.For those who are mathematically deficient, I suggest you to have your Arfken ready beside you (G.B. Arfken, H.J. Weber, Mathematical Methods for Physicist, 5th edition, Academic Press, ISBN 0120598256). As far as I know, this is the only book still in printing that provide almost all mathematical tools required for Jackson: Vector analysis, coordinate systems, tensor analysis, Lorentz group, partial differential equations and separations of variables, Sturm-Liouville theory, Green functions, Laplace, Helmholtz, modified Helmholtz (wave) equations, Bessel functions, Legendre functions (including the second solution and vector spherical harmonics), Fourier series and transform, and many more.Jackson and Arfken are really pair, you can't learn Jackson without Arfken.For those whose lack physical insights and need to brush up your undergraduate electromagnetism, I recommended one and only one textbook: D.J. Griffiths Introduction to Electrodynamics. I compared the discussion in Griffiths and Jackson, and I surprised to find that there are some indentical choices of topics like Jefimenko's equations, potentials and fields, development of Maxwell tensor, even L.V.

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