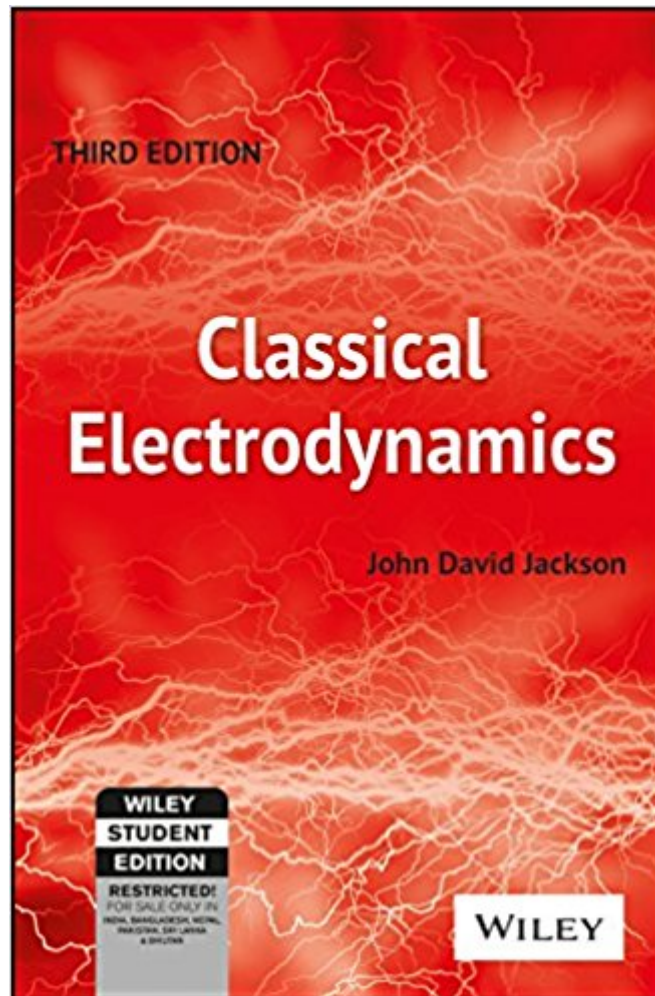




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Classical Electrodynamics



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

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Jackson's book needs no introduction. Because it covers just about everything in classical electrodynamics with unparalleled mathematical rigor, it's been the standard graduate textbook for electromagnetics. In person, the book is actually quite thin for being the bible of electromagnetics. This is because almost no exposition is given for the concepts presented in the book. Equation after equation is thrown at you relentlessly, and the entire book is organized haphazardly. Pedagogically, the book is about as bad as it gets. However, some of the expressions derived in the book can't be found elsewhere, and the brutal problems will ensure that you KNOW electromagnetism. It's a book that will make start making sense after you make it through whatever first year graduate course you take, though at that point you probably won't care (theorists excluded).

In terms of difficulty and pace, reading Jackson is like reading a journal paper, or rather 200 journal papers bound together. Sometimes he skips about 20 steps and tells you it's obvious how he got to the next equation. Even my professor and TA could not explain how Jackson arrived at some of his equations. Also, some of the problems can be a bit tedious, with pages and pages of algebra. On the other hand, I did enjoy Jackson's very rigorous approach. He covers topics concisely and comprehensively.

For a wide eyed young grad student this text can be (Was!) quite daunting, I used the 2nd edition with the Gaussian (CGS) units. The math needed to solve the problems is presented in a haphazard way, not systematically as a mathematician should present it but just given as techniques that work with particular problems-true of the 2nd as well as the 3rd. Bad. Derivations like in Lienard-Wiechert potentials are heuristic at best. The vector potential expressed as an integral over current density divided by distance seems to follow cogently-not rigorously.. Bad. What's good? A careful reading shows the author makes no attempt at an exhaustive comprehensive treatment but usually presents a brief description which happens to be good enough sometimes and gives the reader references to the more exhaustive treatments if not. I disparagingly called this a reference book because it gave

you references-not the interpretation taken by my pipe smoking, ascot wearing comrades. Well in hindsight a complete exhaustive treatment of E&M has yet to be written. It branches off to various specialties. What a grad student needs is a guide and that's what Jackson is. The teacher probably should emphasize this point. The difficulty of the problems largely stems from not interpreting the problem correctly. You have to see what's being said-maybe diagram it. Jackson for many was their first exposure to problems that couldn't be solved in closed form-series solutions. We're comfortable with this in the computer age.

There are some incredibly difficult problem sets to be found here, and I agree with a lot of graduate programs who have decided to scrap the grad E&M requirement for a Mathematical Methods course. However, the material is presented quite well and even to the point where I feel prospective autodidacts might need minimal outside assistance, provided they have a firm grasp on prerequisite materials.

The book provides an in-depth mathematical explanation of electrodynamic laws and phenomena, including, but not limited to electrostatics, electrodynamics and electromagnetic wave propagation. I sincerely recommend it to anyone interested in acquiring a complete understanding of electrodynamics.

I'm a first-year graduate student in the US, and I just used this book in a 3-months long course. Jackson is definitely fine as a reference; it probably has the information you want, once you know what you WANT to look for :) Too dense for self-study or introduction to E&M; may recommend Zangwill for that. Jackson remains a great source of problems though, and solutions can be easily found online

Very difficult reading material requiring huge amounts of time to digest even a few pages. Many of the problems are near insoluble without on-line resources. The copy I purchased turned out to be printed overseas and the binding disintegrated after a couple weeks. If you were hoping for a more advanced version of the Griffith text, this will leave you a little shell-shocked.

One of the most popular books for graduate level Electrodynamics and Magnetism class. It is very difficult to follow at times, but a very thorough book. A classic text to own. Slightly tough to make it a text for independent study, more of a text to use during a graduate class. It is worth purchasing a

new copy because if you're buying it you're in grad school, and you'll most likely keep this text forever. Just in case you're studying independently, most solutions to problems in the book are all online somewhere. Happy shopping! :>

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