referred to for a particular issue. The quality of the photograph needs improvement. Some of the schematic figures do not gel well with the descriptive text. In general, figures may be revisited for all possible corrections and to make them more informative and self-explanatory. Thus there is scope for improvement with the inclusion of latest information and references in the book.

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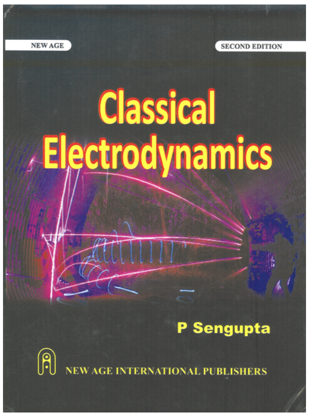

Classical Electrodynamics. P. Sengupta. New Age International (P) Limited, Publishers, 7/30A, Daryaganj, New Delhi 110 002. 2015. 2nd edn. xii + 224 pp. Price: Rs 695.

A thorough command over electromagnetism is an integral part of a physicist's professional toolkit. A student majoring in physics anywhere in the world typically has to study electromagnetism systematically at least thrice. (1) A high-school level course usually introduces the basic phenomena and the fundamental laws without using calculus or vector analysis. (2) Then, in a college-level course, a student learns how the basic principles of electromagnetism can be handled elegantly through vector analysis. Such a course usually ends with a discussion of Maxwell's equations and derivation of the electromagnetic wave. (3) A final graduate-level course covers the more advanced topics which a professional physicist is expected to know.

The book under review is presumably meant for the third advanced graduate-level course and, curiously, bears the same title as the most widely used textbook at that level by J. D. Jackson. I wonder whether the author deliberately chose the same title as Jackson's book. However, this common title immediately leads one to compare the two books.

The present reviewer has taught electromagnetism at the third, advanced level on several occasions and had extensive discussions with other colleagues who have also taught such a course. I have found that often opinions diverge quite a bit as to what should be the curriculum and approach of such a course. One famous book presenting electrodynamics at the advanced level is Landau and Lifshitz's *Classical Theory of Fields*. If one compares this book with Jackson's *Classical Electrodynamics*, then one finds that the two books are about as different from each other as two books on the same subject can be.

While a strictly logical development of a subject has a great esthetic and intellectual appeal, we often depart from such a development in the interests of pedagogy. A student feels more comfortable with a teacher who begins with more easily accessible materials than those which come first from a logical point of view. Landau and Lifshitz begin with the relativistic action principle and show how the whole of electrodynamics can be developed out of it. Although I consider their book to be a masterpiece of incomparable beauty and grandeur, I myself never had the courage to use it as the primary textbook in a course. In spite of the logical appeal of their approach, I was always afraid that a course based on such an approach may leave many students behind – especially those who are not so much inclined towards theoretical physics. So I have been more conservative in my teaching and have usually followed Jackson's path. However, one colleague braver than me once taught the electrodynamics course in our department following Landau and Lifshitz, and told me that majority of the students could cope with it.

Jackson's book, as well as several other textbooks (including Panofsky and Phillips, which I personally admire much more than Jackson), begin with a lengthy discussion of electrostatics focusing on the solution of boundary value problems. It is often argued by some physicists that this is purely a topic of mathematical techniques without involving any deep physics and should not be such a major part of a physics course. I personally find no harm in using physics as an excuse for teaching mathematical techniques. After all, physics and mathematics developed hand in hand till about a century ago. Even in this age of computers, many of us believe that a mastery over the analytical techniques of boundary value problem is an indispensable part of a physicist's training. One can debate whether including these techniques in an electromagnetism course is the best way of teaching them. However, if the curriculum of a university does not include these techniques in any other course, then teaching them as a part of the electromagnetism course becomes a natural choice.

After this somewhat lengthy digression on various issues involved in teaching electromagnetism at the advanced level, we now come to Sengupta's book. The main strength of the book is the author's elegant and pleasant writing style. He has the rare ability of developing complex topics in a systematic, easy-to-follow, step-by-step fashion. It is well known that a presentation of advanced electromagnetism requires several lengthy and involved mathematical derivations – especially pertaining to electromagnetic fields of non-uniformly moving charges and the emission of electromagnetic waves from them. Any student would appreciate the extremely clear and student-friendly presentations of these difficult topics in the book. In fact, I would go as far as to say that I am not aware of any other textbook written and published in India which covers these topics with such clarity.

In spite of these obvious merits, the somewhat unconventional coverage of topics limits the possibilities of using this as a primary textbook in a course. Usually teachers and students prefer textbooks which follow the stipulated syllabus of various universities. To the best of my knowledge, the coverage of topics in this book does not correspond to the syllabi of majority of Indian universities, which normally include advanced electromagnetism as a part of the M Sc physics curriculum. This book does not include electrostatics, magnetostatics or basic properties of electromagnetic waves. The treatment of the boundary value problem – which takes up a couple of hundred pages of Jackson's book of the same name – is completely absent. The author mentions in the Preface that readers may consult his other introductory textbook or 'some other work of its like' – presumably books for the B Sc level – for 'more introductory parts'. This is certainly not a satisfactory arrangement – especially for students of those universities where electrostatics includes boundary value problem in the M Sc-level curriculum and goes much beyond what is taught at the B Sc level. Teachers and students of such universities will find that many topics in their syllabus are not included in Sengupta's book.

The book can be approximately broken into three parts. Chapters 1–4 constitute the first part, which begins with the inhomogeneous wave equation and its solution by the Green's function technique. Then the discussion goes on to the treatment of charged particles moving with varying speed and the emission of radiation from them. After an elegant discussion of radiation reaction, this part ends with multipole radiation. Chapters 5 and 6 make up the second part of the book presenting the elements of plasma physics, including a brief introduction to magnetohydrodynamics. The final part of the book consisting of chapters 7–9 deals with relativistic electrodynamics, after some 'mathematical preparation' introducing tensors in flat Cartesian space.

While one can raise questions about the appropriateness of the overall plan of the book, the author has done a commendable job in presenting the topics covered in a pedagogically attractive fashion. SI units are used throughout the book. Majority of electromagnetism textbooks at this level include sets of exercise problems at the end of various chapters. This is not done in the book under review. In spite of my admiration for the author's writing style, I would not use this as a primary textbook when I teach an advanced electromagnetism course. However, I would strongly recommend this book to students for supplementary reading.

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