and computers apart from the conventional use of notebooks and chalk boards are important in mathematics education. Innovations and design of mathematics teaching material is equally important to make the understanding of mathematical tools enjoyable and meaningful to the student of life sciences. The book does not fail in this. The book has two appendices. Appendix A is about 'Getting started with Matlab', which has a very basic introduction to Matlab to help the novice in getting familiar with the matlab codes. Further, this has references to weblinks for documentation and tutorials. An R supplement is available online as well. Familiarization with this section would help the student to not only solve problems given at the end of each chapter in the book under Matlab skills but in various fields of life sciences. Appendix B is on mathematical notations. Matlab is a programing environment instead of packaged software. Many students of life sciences use spread sheets and packaged software with graphical interface. However, programing is very limited in these and the formula-related details are usually hidden. In Matlab, the entire program can be seen and used by modifying an existing script and has the advantage of advanced graphics of professional quality. Mathematics education in India at the school level has a strong Math Homework component with Math problems that students learn to solve and work through. The book has lot of problems at the end of each chapter that allows one to practice and learn.

The commitment in making the book easy to understand by biologists has in great measure to do with the authors of the book. Erin Bodine is an Assistant Professor at the Rhodes College, Memphis, with research interest in mathematical ecology and teaches a course on math for the life sciences including calculus. Suzanne Lehhartis a Professor of Mathematics at the University of Tennesse, Knoxville, with research interest in population and disease models, Louis J. Gross is the Director of the National Institute for Mathematical and Biological Synthesis and Professor of Ecology and Evolutionary Biology and Mathematics at the University of Tennesse, Knoxville with research interests in computational and mathematical ecology and has been actively involved in quantitative training in the life sciences.

Considering the challenges in the teaching of mathematics and its application to the life sciences, the *Mathematics for Life Sciences* can form a core text book for teaching the students of life sciences. Education in the life sciences in India at the undergraduate level is undergoing metamorphosis, a rather slow one, with universities like the Delhi university now having a B Sc. Life Sciences program with mathematics and statistics as integral part of the curriculum. In select universities and institutes, mathematics is taught at the Masters level as a core subject to biology students. Problem with the study of mathematics is the fear associated with its learning. This book would help serious students of biology to conquer that fear and help them to appreciate its potential application in the life sciences and in their own research. I would recommend serious students of modern biology to have a personal copy of this book. Mathematics cannot simply be ignored anymore by the biologists.

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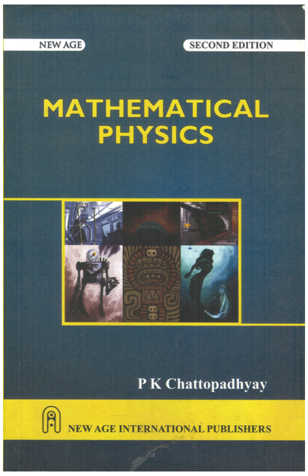

Mathematical Physics. P. K. Chattopadhyay. New Age International (P) Ltd, 7/30A, Daryaganj, New Delhi 110 002. 2003. xii + 352 pp. 2nd edn. Price: Rs 250.

The book under review, *Mathematical Physics*, is designed as a text book for students pursuing M Sc degree in physics in most Indian universities. Divided into 8 chapters the book covers, in about 350 pages, all topics which form an integral part of the basic training of a physics student at the Master's level. These include: complex variables, partial differential equations, second order differential equations, special functions, boundary value problems, Green's functions, linear vector spaces and group theory. Each chapter contains a large number of problems, solved and unsolved, to illustrate the concepts and the methods developed therein. To sustain the interest of the intended readership, the exercises and worked out examples are largely drawn from various areas of physics such as quantum mechanics, electrodynamics, elementary particle physics, etc.

Going through this book, particularly if one has had occasions to teach mathematical physics, one cannot help appreciate the fact that this book is a product of years of teaching experience and a strong commitment to quality teaching. Written with care, in a reader-friendly style, it provides sufficient prior motivation for each new concept that is discussed and also cautions the reader against pitfalls that arise when one tries to apply a given mathematical result beyond its domain of validity.

Having said that I would also like to take note of the fact that the book has not been properly proof-read prior to its publication. For instance, the chapter on linear vector spaces and matrices consisting of 47 pages has at least 35 typographical errors in the form of missing symbols, inconsistent use of fonts, missplelt names, etc.

As to the overall organization of the book, I have some specific suggestions for improvement, should there be a plan to bring out the third edition of this rather useful book:

- The locations of the chapter on linear vector spaces and matrices and that on complex variables should be swapped. Within the scope of this book, the chapter on complex variables stands on its own and can appear as chapter seven without affecting the flow of the book. On the other hand, the notions and constructs developed in the chapter on linear vector spaces thread through chapters 2 to 6 and it should therefore rightfully be placed ahead of them.
- In the chapter on complex variables, while discussing functions with branch

point singularities it would be helpful to remark that there are two ways to tackle the multi valuedness of functions involving logarithms or fractional powers, either by suitably restricting or by extending the complex plane by endowing it with an appropriate Riemann sheet structure. In this context, it would also not be amiss to include a reference to a recent book by A. K. Kapoor, *Complex Variables: Principles and Problem Sessions* (World Scientific, 2011) for further details.

- In the section on eigenvalues and eigenvectors of a matrix in the chapter on linear vector spaces, there is no indication that an arbitrary $n \times n$ matrix may not have n linearly independent eigenvectors. Further, inclusion of only those examples where the eigenvectors do indeed form a basis, may mislead a student into believing that this is always so. Again, in the section on simultaneous diagonalization of matrix, for emphasis, a remark to the effect that the ensuing discussion presumes that the matrices in question can be diagonalized individually would be helpful. Further, in the section on matrix representations of linear operators, before proceeding to representations in an orthonormal basis it would be appropriate to note that while a linear operator can be represented by a matrix in any basis, its abstract properties are more manifest in its representation in an orthonormal basis: unitary operators are represented in an orthonormal basis by unitary matrices, self-adjoint matrices by hermitian matrices, etc. Also in the discussion on transformations of operators on page 249, a few lines on active and passive points of views would be in order.
- In chapter 3, which deals with series solutions of second order differential equations, it would be appropriate to introduce the Gamma function right away rather than wait till chapter 5 and tell the reader then and there how to write down the solution of essentially one step recursion formulae with polynomial coefficients in terms of Gamma functions. This would not only save space in the text but also save the reader from working out each individual term and then guessing the structure of a general term.
- The opening section on boundary value problems could do with some remarks on partial differential equations, boundary conditions and their classification in a more general setting. Similarly in the chapter on special functions some effort should be made to present a unified view of all classical orthogonal polynomials rather than treating each system case by case.
- In putting together the postulates of quantum mechanics as done on page 253, it should be made clear that the discussion therein applies to systems with one (or more) cartesian degrees of freedom . This is essential as otherwise a naive reader may be led to believe that one has a commutation rule as in equation (7.147) even for finite state quantum systems. As a matter of fact I would rather leave a detailed discussion on postulates of quantum mechanics to a more specialized book and confine myself to outlining, in a qualitative way, how the notions of wave-particle duality eventually found place in the Hilbert space structure of quantum mechanics.

These remarks notwithstanding, which, as noted earlier, are meant for future use, the book under review in its present form is a useful and a quality text book on mathematical physics designed to cater to the needs of physics students at B Sc honours and M Sc level in almost all Indian universities. The publishers would add enormously to its value by having it carefully proof read. I for one would be more than willing to supply them my compilation of the typographical errors as a step towards this worthy cause.

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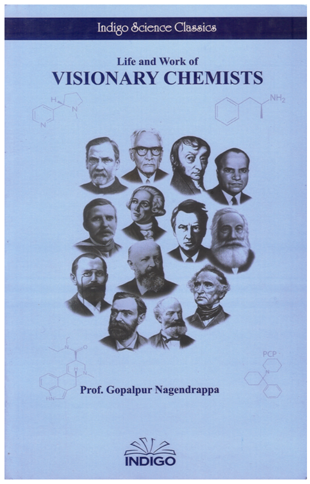

Life and Work of Visionary Chemists. Gopalpur Nagendrappa. Indigo Science Classics, Bangalore. 2014. 203 pp. Price: Rs 160.

Consider the following statements:

1. All substances are made up of atoms of elements.
2. When a substance burns in air, it undergoes a reaction with oxygen.
3. When a plant grows, it assimilates carbon from the air; not from the soil.

To most people, these would seem like common knowledge. But, if you think about it, they are not simple observational facts like ‘the sky is blue’ or ‘the length of days is shorter in winter than summer’. In fact, they were absolutely not obvious 300 years ago. The genesis of each of them involved a long and very interesting set of events: a history intertwining human creativity, social circumstances and serendipity.

Life and Works of Visionary Chemists takes the readers through this history, looking at the lives of scientists who helped formulate the statements above and many other chemistry concepts that we take for granted today. The book is a collection of articles on thirteen scientists who lived between 1743 and 1981 and participated in significant moments in the history of modern chemistry (chemistry after the mid eighteenth century). Each article combines the biographical sketch of a scientist with his contributions to the field. (Women’s contributions to chemistry, with rare exception, are not mentioned – unsurprising given the period that the book considers.) The foreword by the author describes the primary goals of the book as presenting chemistry as a human activity, locating scientific ideas