A Laboratory Guide to Glycoconjugate Analysis. P. Jackson and J. T. Gallagher (eds). Birkhäuser Verlag, Basel. Boston. Berlin, 1997, Price Sfr. 128 (H.B.) 405 pp.

Glycoconjugates play a variety of roles in the biological systems and these roles are determined by their carbohydrate molecules. A search for an understanding of the functions of the carbohydrates has stimulated an upsurge in the development of methods for the analyses of both their biological interactions and their chemical structures. This book is designed to fulfill the need for an up-to-date compendium that describes in detail, the well-proven and effective methods for the analysis of complex carbohydrates which occur in biological systems. The book serves as a laboratory guide to glycoconjugate analysis. The editors have effectively complied twenty chapters on different aspects of glycoconjugate analysis, contributed by experts in particular areas. Each chapter describes the principle of the method used, detailed procedure including sample preparation and detection techniques, merits and demerits of the technique, trouble shooting, acknowledgements and references.

The book provides an account of the method used for the detection and analysis of carbohydrates in glycoprotein including detection and blotting. There is a good coverage of the use of HPLC in glycoconjugate analysis. A considerable portion of the book has been devoted to HPLC of derivatized and nonderivatized oligosaccharides, HPLC strategies for profiling and sequencing oligosaccharides, the application of three-dimensional HPLC to the identification of N-linked oligosaccharide structure, determination of the disaccharide composition of glycosaminoglycans by HPLC and simultaneous fluorescent labelling and biotinylation of oligosaccharides – a versatile approach to the HPLC analysis of oligosaccharide structure and function. High performance anion-exchange chromatography-pulsed amperometric detection (HPAE-PAD) monosaccharide and oligosaccharide analysis of glycoproteins electrotransferred onto polyvinylidene fluoride membrance is discussed.

Gel electrophoresis occupies a unique place in the glycoconjugate analysis. A review concerning the polyacrylamide gel electrophoresis of fluorophore-labelled reducing saccharides is provided in this book. Also included are carbohydrate analysis with capillary electrophoresis, oligosaccharide profiling of keratan sulphate, analysis of the structure of heparin and heparan sulphate by high-resolution separation of oligosaccharides, application of two-dimensional capillary electrophoresis to the identification of glycan structures, analysis of protein–carbohydrate interactions by FACE/Gel retardation assay, application of capillary affinity electrophoresis to the analysis of carbohydrate–protein interactions and analysis of protein-glycosaminoglycan interactions by affinity co-electrophoresis. Preparation of neoglycolipid for structure and function assignments of oligosaccharides is also discussed.

The book will be useful to students and researchers in the field of chemistry and glycobiology, and engaged in analytical work involving glycoconjugates.

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A Brief Introduction to Numerical Analysis. Eugene E. Tyrtyshnikov. Birkhauser-Verlag, AG, P.O. Box 133, CH 4010, Basel, Switzerland. 1997. 202 pp. DM 118.

Numerical analysis is one area which is useful to the majority of scientists and engineers. Some of the methods still widely used are very old (e.g. the Newton–Raphson method) while others are very recent (e.g. wavelets).

Of the recent advances, wavelet analysis[1] is one technique which has become enormously popular (almost to the point of becoming a fad) over the past few years. Wavelet theory involves representing general functions in terms of simpler, fixed building blocks at different scales and positions. The wavelet analysis is particularly useful since individual wavelet functions are quite localized both in space and frequency (or characteristic scale). Because of this feature, large classes of functions and operators when represented using wavelets become sparse which makes computation very fast.

Finite element method is another major tool in numerical analysis with applications in structural mechanics, fluid mechanics, thermal analysis, etc. Traditionally, the finite element method used piece-wise polynomials of fixed degree p, and it was the mesh size h which was decreased for increased accuracy. Recently, methods where h is kept fixed and p is increased (the so-called p version) and where both h and p are varied (the h–p version) have been proposed[2]. For certain problems, these versions have much higher rate of convergence compared to the traditional h version.

Solutions of linear systems form another important component in numerical analysis. The numerical solution of large sparse linear systems lies at the heart of many large-scale scientific and engineering computations. One of the significant advances in direct methods for sparse matrix solution was the development of the multifrontal method[3]. The method reorganizes the overall factorization of a sparse matrix into a sequence of partial factorization of dense, smaller matrices. This method is most advantageous for positive definite systems. Developing parallel algorithms for dense and sparse linear matrices has received a lot of attention with the advent of fast parallel computers[4]. These algorithms aim to break down the computational work into a number of subtasks that can be assigned to separate processors leading to considerable speed up. The main challenge has been to adapt the number and size of these tasks to the target parallel architecture. Maximum success has been obtained for the numerical factorization part and less progress is visible in other areas like ordering.

There has also been a lot of research on replicating (with suitable modifications) the procedures for solving eigenvalue problems (in particular the Arnoldi and Lanczos algorithms) for self-adjoint operators to unitary operators[5]. Advances have also been made in solving the Toeplitz systems, which form an important class of linear systems with applications in signal processing, time series analysis, image processing, etc. Recently, fast direct Toeplitz solvers have been developed[6] which require $O(n \log^2 n)$ operations. Preconditioned conjugate gradient methods have been proposed[7] which require only $O(n \log n)$ operations and are more stable.

There have been several important developments in numerical solutions of initial value ordinary differential equations (ODEs). Special methods, which deal with ODEs having symplectic structure, have been developed over the last decade[8]. Methods which preserve phase space volume and integrals of motion have also been proposed. Taylor series methods (to very high orders) have become practical and more widely used with the advent of techniques like differential algebra. Like Taylor series methods, ODE solvers of the extrapolation type were also historically considered poor cousins of the more famous RK and Adams algorithms. General interest in extrapolation methods has been revived recently with the development of a new A-stable discretization based on the semi-implicit mid-point rule along with new order and step-size control methods[9].

The list of recent advances in the area of numerical analysis that we have listed above is, needless to say, subjective and incomplete. However, we hope we have conveyed a flavour of recent developments in the field.

Coming to the book under review, the author has wisely decided not to write yet another cook book describing the various algorithms. There are already many such books (several of which are excellent). It is oriented towards mathematicians and those who want to understand the proofs behind various results routinely used in numerical analysis algorithms. It details some of the technical results that have been recently proved. Therefore, it provides a good mathematical base from which one can aspire to read recent research papers in the area. The book is, however, heavily biased towards solutions of linear systems. Slightly more than half of the 200-page book is devoted to this area. On the other hand, there is no mention of ODEs and PDEs! Other topics in numerical analysis like interpolation, solutions of nonlinear equations, least squares method, splines, numerical integration, optimization, integral equations, etc. are all compressed into less than 100 pages. In this sense, there is a serious imbalance in the topics treated in this book.

The book is organized as a series of 21 lectures with 11 lectures devoted to linear systems. The book starts with an explanation of metric spaces, norms and various types of matrices. This should be useful to non-mathematicians. The book then delves into the details of solving linear systems with special emphasis on the QR algorithm. The fifth lecture deals with spectral distances, clusters, etc – topics not usually found in books at this level and presumably included because the author has contributed to this area. Standard methods like LU decomposition, Cholesky and Gram-Schmidt methods are also dealt with in some detail. The treatment of all these topics is mathematically rigorous. The second-half of the book is a compact but readable treatment of the remaining topics in numerical analysis (the glaring omission being differential equations).

To summarize, this book would be useful to readers interested in a mathematically rigorous treatment of various topics in numerical analysis (especially linear systems). However, those with interests in differential equations should look elsewhere.

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Textbook of Nutrition and Dietetics. Kumud Khanna *et al.* Phoenix Publishing House Pvt Ltd, 22 Prakash Apartments, Ansari Road, Daryaganj, New Delhi 110 002. 1997. 355 pp. Rs 155.

While nutrition is a science, dietetics is its practical application. Translation of the knowledge of nutrition into nutritionally balanced diets which are culturally acceptable and suitable for different income, age, and physiological groups, demands knowledge of disciplines such as anthropology, economics, human psychology, food chemistry, etc.

While balanced diet is important to maintain good health in healthy individuals, diet and nutrition are extremely important in the management of diseases as well. Special knowledge of therapeutic nutrition and diets is needed for the management of degenerative diseases like, diabetes, cardiovascular diseases, gastro-intestinal and liver disorders, and renal disorders. Yet, Nutrition and Dietetics are neglected fields in India.

Most hospitals in India, except a few big corporate hospitals, do not have a dietician on their staff, and many physicians do not realize the importance of therapeutic diets. In this scenario, the above-mentioned book is timely and valuable. Though primarily aimed at undergraduate and post-graduate home science students and teachers, medical and nursing students, teachers, and practitioners would also find it useful. The book is written in a simple, reader-friendly style, and hence even lay people with some knowledge of biology (or even without it), will find it helpful.

The introductory chapter is very short and discusses the scope of the book. The subject matter is presented in three units – meal planning (unit I), normal nutrition (unit II) and therapeutic nutrition (unit III), with further division into chapters under each unit. At the end of each chapter some key words and exercises are given. A common list of some important references is given at the end of the book. For many tables, the source is not mentioned beneath the table and hence the reader has to guess the source from the list of references. Some references mentioned in the text eg. Sauberlich *et al.* 1974 (page 56), do not figure in the references list. Two