Good introduction to study of dynamics

Analytical Mechanics with an Introduction to Dynamical Systems, Josef S. Torok; US$80.00 hardcover 0-471-33207-0, 376 pp., Wiley-Interscience.

The book has an interesting mix of theory and physical explanation of phenomena being studied. This is generally not the case with books being either more detailed in one aspect or the other. A wide variety of problems are given at the end of most chapters, particularly chapters 1, 2, 4 and 5, providing a good exercise to develop the ability to understand physical problems and model their behaviour as a step to understanding the nature of dynamics.

Inclusion of a chapter covering computer simulation of related equations increases the appeal of the book. The small section on gyro dynamics could have been expanded. Computer simulation material was meager and touched on just the basics, but that is justified given the main thrust of the book is a study of dynamics. Problems in dynamics are so different that one can never include all types, yet a few solutions to problems would have added to the subject matter.

It will basically be of interest to graduate students of mechanical engineering, however the subject matter can be readily grasped by physics and mathematics graduates. In addition, it will also be of interest to practising engineers, wishing to embark into the realm of dynamics.

Overall, the book is a welcome addition to the wide collection on this subject. It's written in an easy to understand language with appropriate explanations and details, providing introductory/medium level material for any interested engineer/mathematician to step into the world of dynamics.

Methodology may be applied to real problems

Elasticity in Engineering Mechanics, 2nd Edition, Arthur P. Boresi and Ken P. Chong; US$90.00 hardcover 0-471-31614-8, 615 pp., John Wiley & Sons.

Engineering mechanics is a fascinating subject and a major portion of the problems confronted by engineers can be solved by elastic considerations alone. As such, the subject matter has a wide appeal to both students and engineers.

The book is well balanced in its discussion of the subject matter and the first chapter provides an overview as to how various theories and fields are related and how they come together in different kinds of analyses. Coverage of two- and three-dimensional areas are attacked from different coordinate systems. Also special cases are elaborated in some detail to explain how the theory arrived at can be used to solve real problems.

The book is a little heavy in mathematical details, but that is to be expected due to the nature of the subject matter, although many practising engineers find it difficult to digest. Besides, a number of these mathematically intensive problems are analyzed and presented separately in appendix form, and therefore may be easily ignored without distracting from the main text.

It will be of interest to engineering students at graduate and postgraduate levels, practising engineers, and to those interested in study of advanced topics like solid mechanics and finite elements.

Both books reviewed by Tahir Rasul, P.Eng.

Search for better global performance has wide appeal

Shape and Structure, from Engineering to Nature, Adrian Bejan; C$149.60 hardcover, ISBN 0-521-79049-2, 344 pp., Cambridge University Press.

A brand-new book titled *Shape and Structure, from Engineering to Nature* offers important insights into a global process of optimization, and how we might proceed with engineering design to change our future. It offers entirely original, new perspectives that could help the engineers in all branches find new paths, new inspirations, and new roles of engineering in society. Everywhere we look today, from education, business and politics to the Nobel Prize, engineering is either low or not at all on the ladder of respect. However, all in the field will agree that the engineering reality is a lot brighter. An idea coming from this fascinating book is that we as engineers, with our language and feel for the concept of objective, constraints, and optimization, are ideally positioned to play more important roles in society; to define the theoretical agenda not only for life science, but for economics, business and society as a whole, in this new century.

Shape and Structure, from Engineering to Nature was written by Professor Adrian Bejan who spent more than a decade doing survey research to discover the values we in engineering hold dear. He finds that optimized geometries such as the round ducts, I-beams, tree-shaped flows, streets and highways, and the river cross sections emerge not only in our minds and on our drafting tables but also in nature. In this groundbreaking book, Bejan starts from the design and optimization of engineered systems and discovers more a general, deterministic principle for the generation of geometric form in natural systems. He calls this the "constructal" law of maximizing access (migration) for things that flow, or minimizing flow resistance, time, cost. This observation leads him to formulation of constructal theory, which is a hierarchical way of thinking that accounts for organization, complexity and diversity in nature, engineering and management.

In brief, this book is about the great puzzle that has been with us from the beginning of scientific thinking and engineering: From what principle can geometric form be deduced? Optimal distribution of imperfection is the mechanism that generates form. Flow systems will always be imperfect because of resistances, which are due to size constraints. The constructal principle is the minimization of many internal resistances together, in a balanced way, and from this balance results the structure of the system. The principle accounts not only for simple geometric forms, but also for any other engineered structure, such as power plants, transportation and telecommunication systems, architectural and construction objects, even economic structures. It accounts also for the allometric laws of physiology, such as the relation between metabolic rate and body size. The search for better global performance (optimization) has been with us throughout the history of engineering. The beauty of this book is the streamlining of its study into an elegant, single principle.

Among the topics covered are mechanical structure, thermal engineering and thermal management components, ducts and channels, and structures in transportation, communications and economics. The numerous examples demonstrate that the performance of the structural design developed within this study is superior compared to that of previously known optimization methods. This fascinating book is recommended as a text or reference for innovative, advanced design courses in all branches of modern engineering, including biomedical, transportation, and environmental engineering, architecture and spatial economics. Further, I strongly recommend it as a must read to all engineers who are experimenting with original, radically different concepts and ideas and who are poised to make a lasting impact on society.

Reviewed by Jovica R. Riznic, PhD, P.Eng.

Engineering Dimensions reviews books of general interest to professional engineers. Comments made are the opinion of the reviewer.

In Council
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Executive Committee appointment

Council appointed Lieutenant Governor Appointee (LGA) Nancy Hill, P.Eng., LLB, as a member of PEO's Executive Committee. Under Regulation 941/90, Council annually appoints a Vice President to the Executive Committee from among PEO's elected Councillors, as well as at least one Member from among all Councillors. In recent years, Council has appointed at least two Members, one of them an LGA. These appointments are usually made at the first meeting of Council following the AGM. However, at its first meeting this year, on April 21, 2001, Council could not agree on the appointment of an LGA to the Executive Committee, so it approved continuing the term of LGA Laurier Proulx. With Hill's appointment, Proulx will no longer sit on the Executive Committee. ◆

Professional Codes
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for lawyers will be built on a combination of voluntary and mandatory elements aimed at practice improvement and quality assurance. The building blocks of the program include practice guidelines, practice enhancement through self-assessment and peer assessment, continuing legal education, specialist designations, and remedial components.

In teaching, the provincial government is phasing in implementation of several competence-based initiatives, including a qualifying test for new teachers applying to the Ontario College of Teachers, a re-certification process, and a province-wide, standards-based performance appraisal plan. The new entrance test is aimed at demonstrating that each new teacher has an acceptable level of knowledge with respect to competencies and expectations in the Ontario curriculum, teaching skills and strategies, learning theory, special education, classroom management, the use of educational technologies, and legislation relating to expectations for teachers.

According to Doug Wilson, deputy registrar, Ontario College of Teachers: "The new re-certification process, to be implemented in September 2001, will ensure that teachers keep their skills and knowledge up-to-date by requiring them to participate in ongoing professional learning."

The duty and accountability to the public of regulated professionals is also now extending to their regulatory bodies. A recent report commissioned by the Ontario Ministry of Health concerning regulatory practices of the College of Physicians and Surgeons of Ontario has recommended that the public make up the majority of members on the council that governs the organization that licenses and regulates Ontario's doctors. The report by KPMG Consulting states that "a public body can only have the confidence of the public if it has a strong and direct relationship with the public." According to a report in the *Globe and Mail*, the KPMG study's mandate was to look at whether the college's complaints and discipline processes function well and are accountable. The report criticized the college for operating in "relative isolation" from the broader health-care system and the public. ◆