find and effectively utilize such a collection of experts seems deserving of an Olympic medal!

The editors, associate editors, chapter authors, validators, and NIST staff members deserve our thanks for their very successful and valuable product. I hope it will be possible for NIST to regularly maintain and update this essential resource. The collective talent displayed should not be dissipated. Incidentally, I noticed that, aside from Olver, only T. M. Apostol (1923–) was among the contributors to Abramowitz and Stegen. Olver, indeed, survived the Herculean effort gloriously, while his predecessor Milton Abramowitz did not.

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Constructions of Strict Lyapunov Functions. *By Michael Malisoff and Frédéric Mazenc.* Springer, London, 2009. $159.00. xvi+386 pp., hardcover. ISBN 978-1-84882-534-5.

To strictify is not a certified English verb, nor is *strictification* a certified noun. They should become so. Indeed, to have a Lyapunov function associated with a given process, i.e., a function that does not increase along solutions, is nice, but having a strict Lyapunov function, i.e., a function that strictly decreases along solutions, is of much greater help. Many natural processes possess Lyapunov functions that are not strict, and are associated primarily with energy. The prime contribution of the book under review is to teach us how to strictify, when possible, these functions.

This is an important and painstaking chore. It is important, since although mere stability or asymptotic stability can be established with the aid of Lyapunov functions paired with observations like the LaSalle invariance principle, when it comes to rates of convergence, uniformity, robustness under perturbations, sensitivity estimates, etc., there is no substitute (within the Lyapunov functions paradigm) for strict Lyapunov functions. It is painstaking, since there is no general clean theory or a grand recipe showing how to find a strict Lyapunov function or how to strictify a given Lyapunov function. Some principles are available, but there is a need to adapt them to the special cases, recruiting a variety of technical tools and detailed tricks. In this respect, Michael Malisoff and Frédeŕic Mazenc provide a well thought out mix of concrete, fully computed, detailed examples along with enlightening explanations and background material. One can definitely see both the forest and the trees.

The book is a combination of a research monograph and an expository text. The strictification and some other stability considerations are based, to some extent, on the authors' own research. The theory and examples are grouped according to a conceptual context and the mathematical structure. Thus, both controlled and uncontrolled ordinary differential and difference equations are addressed, and in regard to structure the monograph examines time-varying and time-invariant processes, multiple scale models, and hybrid systems. The differences in applying the techniques to the different categories are well explained, with appropriate cross-referencing given. In addition, I found the monograph to be very carefully edited with pedantic proofreading. Thus, the reading of the rather technical material is quite smooth.

The monograph, however, is addressed to experts, or at least to those who have taken good courses in ordinary differential equations and control systems. For those who have the appropriate background the monograph is a rich source of ideas, techniques, and examples in Lyapunov stability, stabilization, and, of course, strictification of Lyapunov functions. One point of warning, though: In an attempt to cover the advanced analysis frameworks, the authors frequently address the "input to state stability" (ISS) notion of Eduardo Sontag. While it subsumes traditional stability notions and provides a much needed generalization to the nonlinear control settings, in order to use it one needs several definitions and notations. Hence, a practitioner who wishes to find in the book a solution to a concrete problem, but who is not trained in ISS, may find it difficult to identify the relevant tree without first mastering ISS (not a bad idea, in fact).

Who should own or have access to this book? Certainly, those who need to analyze or to perform a detailed stability or stabilization analysis of concrete equations will find the book a very good source of ideas and references. In that spirit, the monograph should be a desired addition to all libraries that serve mathematics departments and control engineering faculties. The book is, however, a bit detailed for those who simply wish to sample what strictification of Lyapunov functions is. However, although not its original purpose, the text, or parts of it, could be used successfully as reading material for advanced graduate students interested in the subject matter.

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Understanding Fluid Flow. *By Grae Worster.* AIMS Library of Mathematical Sciences Series. Cambridge University Press, Cambridge, UK, 2009. $24.99. xiv+104 pp., softcover. ISBN 978-0-521-13289-3.

According to the description of the series of texts to which it belongs, this book is designed as a "self-study guide" on topics constituting applications of mathematics. Specifically, the book focuses on fluid mechanics, a subject that has posed many of the problems that motivated the development of the techniques of modern applied mathematics. As a fluids text, the structure and content of the book are not traditional: classic texts of fluid mechanics (such as Lamb's *Hydrodynamics* or Batchelor's *An Introduction to Fluid Dynamics*) usually begin with inviscid fluid mechanics and later consider viscous fluids. Worster, on the other hand, kicks off with some specific viscous flow problems and only rather later tackles some of the traditional inviscid potential flow problems. The aim is to thereby exploit everyday experience and simple experiments to help build insight and intuition into the dynamics of fluids.

The book is chiefly designed to provide an introduction for an undergraduate student interested in learning about fluid mechanics for an impending masters or doctorate program, or simply in exploring some applications of partial differential equations. However, I imagine that a graduate student who has already embarked on his or her degree may find the book useful as a means of refreshing or making up missing background material. As an academic, I found the book a pleasant read, and I could imagine lecturers finding the exposition helpful in providing tips for class material or a different perspective. The book is not a reference text, being fairly elementary in places and not providing detailed coverage of advanced topics. It might provide a useful text for a course that lightly covers fluid mechanics as part of its syllabus. Its main topics are as follows.

1. Physical properties of fluids (stress, viscosity, and more).
2. Solutions for simple parallel flows (unidirectional shear flows), including approximations for nearly parallel flows and similarity solutions.
3. Spreading viscous currents, including ideas of scaling analysis.
4. The equations of fluid mechanics, the use of a streamfunction, reduction to dimensionless form, the deduction of the Reynolds number and the significance of its limits, and the use of integral relations (the Bernoulli law and the momentum integral) as shortcuts to solving problems.
5. Vorticity.
6. Potential flow, d'Alembert's paradox, drag, and lift.
7. Everything else (water waves, ship waves, and the Kelvin–Helmholtz instability).

I enjoyed the tack taken by the author in approaching the subject and his selection of topics. The book certainly gives an idea of the wide application of the methods of mathematics and physics to problems in areas ranging from geophysics to engineering. It is perhaps a little uneven in places: cer-