

Foreword

Fluid Mechanics constitutes the foundation of what is now referred to as “Water Engineering,” entailing hydraulics, hydrology, groundwater engineering, environmental engineering, irrigation and drainage engineering, and hydropower engineering. It is therefore the first water course at the undergraduate level in these branches of water engineering. Further, courses at the graduate level that present physically-based models have their basis in fluid mechanics. Despite its vital importance in understanding the physics of water engineering courses, fluid mechanics has received limited emphasis at the graduate level programs in water engineering, especially in hydrology, groundwater engineering, irrigation engineering, and environmental engineering. This may partly be because it demands a higher level of mathematical preparation which many students do not relish. This may also be because textbooks on fluid mechanics are not always user/reader friendly. Many of these books do not contain practical, easy-to-use-and-solve problems, more derivations than solved problems, and limited range of applications. Hence, there is a need to develop a book that focuses on problem solving. Furthermore, these days there are umpteen computer software available which can be employed to solve a wide variety of problems and these software are easily accessible to undergraduate students in most engineering departments. One of the most popular and versatile software is called MATLAB and fortunately many students in the beginning years of their engineering studies become well versed in the application and use of this software. Admirably Professors K. Srinivasa Raju and D. Nagesh Kumar, who are well established and recognized scholars in water engineering, recognized the need to bring fluid mechanics to the fingers of undergraduate students and embarked on a journey to address this need. Both these professors are highly accomplished and have long years of experience in teaching fluid mechanics at the undergraduate level.

Fluid Mechanics: Problem Solving Using MATLAB is probably the first book that is exclusively devoted to problem solving with the use of MATLAB. This book will be an excellent supplement to a regular fluid mechanics book used in teaching fluid mechanics at the undergraduate level. This book contains problems on virtually all topics that are covered in undergraduate fluid mechanics courses plus more. The subject matter of the book encompasses 16 chapters and an appendix, including fluid properties, pressure measurement, hydrostatics, buoyancy, hydro-kinematics, Bernoulli applications, momentum principle, orifices

and mouthpieces, notches and weirs, flow through pipes, laminar flow, turbulent flow, boundary layer theory, drag and lift, open channel flow, and dimensional analysis. The book includes 161 example problems, supported by corresponding MATLAB codes compatible with 2016a version. It also includes 8 derivations and 162 exercise problems. A very appealing characteristic of the book is live demonstration of representative codes (12 codes in mp4 format) which current generation students will find very fascinating. The appendix comprises representative textbooks on Fluid Mechanics and selected MATLAB commands.

The book is easy to read and follow and will have a great deal of appeal to undergraduate students. It will be equally appealing to faculty members who are engaged in teaching fluid mechanics at the undergraduate level. Both Professors Srinivasa Raju and Nagesh Kumar are to be applauded for writing this book and making fluid mechanics attractive to undergraduate students. They have done a great service to undergraduate teaching and will be an inspiration to those may venture to write similar books in other branches of water engineering.



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