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REVIEW

Fluid Transients in Systems. By E. B. WYLIE and V. L. STREETER. Prentice Hall, 1993. 463 pp.

Water Hammer in Pipe-Line Systems. By J. ZARUBA. Elsevier, 1993. 362 pp. $218.75.

An earlier review (*J. Fluid Mech.*, vol. 248, 1993, p. 688) discussed books on engineering applications of unsteady flows (Azoury) and unsteady thermo-fluid-mechanics (Moody); now we have two further books on unsteady fluid mechanics. The first is a new and much up-dated version of earlier volumes by Wylie & Streeter; the emphasis is on one-dimensional pipe and channel flows. However, it is wide ranging in that although it presents a 'hydraulics' approach (dealing mainly with liquid flows) it also includes reference to liquid–gas mixtures and, later in the book, a chapter on transients in pipes carrying natural gas. The authors concentrate on the solution of the unsteady flow equations by the method of characteristics using computers, but other methods of solution are described as well. All kinds of boundary conditions (e.g. pipe junctions, area changes, valves, pumps and turbines etc.) are added to the basic 'water hammer' computer program, so that very complex systems may be analysed.

This is a scholarly and comprehensive book, which includes a useful listing (in text and on diskette) of the various computer programs referred to in the text, together with data files and output results for examples given.

The second book also describes water hammer in complex pipe systems, and the application of the method of characteristics to the solution of many varied but essentially one-dimensional unsteady flows. Again there is considerable detail of the various boundary conditions that may be imposed on the basic pipe flow. But the main feature of the book is in the very detailed description of how to use the basic water hammer (WTHM) program which is available on a diskette, suitable for use with a PC, together with input data files for the examples described in the text.

This book is obviously a useful tool for engineers concerned with practical problems of unsteady flow in water-pipe systems of great complexity, although it is not as wide in its scope as the book by Wylie & Streeter, or the earlier volume by Moody.

In discussion of the earlier books, this reviewer commented on the surprisingly independent development of computer solutions (using the method of characteristics) for incompressible and compressible flow. Here again we have an enormous amount of effort and expertise put into parallel development of such programs, and also into making them simple to use and widely available. One is tempted to conclude that work in this area has essentially now been completed, and that these four books, together with that by Benson referred to in the earlier review, provide all that the engineer needs to know on the subject of unsteady one-dimensional fluid dynamics, subject of course to the initial limitations on the simplified equations used to describe the flow.

J. H. HORLOCK