

Water Environment Modeling

By Clark C.K. Liu, Pengzhi Lin, Hong Xiao

ISBN 9780367442439 - Copyright Year 2022

Forthcoming by CRC Press 334 Pages 147 B/W Illustrations



Water Environment Modeling



**Clark C.K. Liu, Pengzhi Lin,
and Hong Xiao**

Water Environment Modeling covers the formulations and applications of mathematical models that simulate water flow and chemical transport in rivers, lakes, groundwater, estuaries, coastal, and ocean waters. These models are used to evaluate the response of water environment to human interventions and serve as useful analytical tools for water pollution control and resource management.

Simple and comprehensive modeling techniques and their practical applications are presented with examples and exercises, most of which are derived from actual case studies. In general, simple models can be solved analytically and comprehensive models require numerical solutions. While simple models are usually adopted for preliminary assessment of a particular water environment, comprehensive models are used to provide detailed spatial and temporal variations of pollutants in complex environments. The system-based models in the forms of integral equations are introduced as an alternative modeling approach.

This textbook is ideal for advanced undergraduate students and graduate students in civil and environmental engineering and related academic fields. It is also suitable as a reference book for practicing engineers and scientists.

Authors:

Clark C.K. Liu is Emeritus Professor of the Department of Civil and Environmental Engineering at University of Hawaii and former Program Director of Environmental Engineering in the US National Science Foundation (NSF).

Pengzhi Lin is Professor of State Key Laboratory of Hydraulics and Mountain River Engineering at Sichuan University. He is the author of *Numerical Modeling of Water Waves* (CRC Press, 2008).

Hong Xiao is Professor and Vice Director of Hydroinformatics Institute of the State Key Laboratory of Hydraulics and Mountain River Engineering at Sichuan University.

Table of Contents

1. Introduction
2. Environmental Hydraulics and Modeling
3. Numerical Methods for Water Environment Modeling
4. Ideal Reactors and Simple Water Environment Modeling
5. Watershed Hydrology and Modeling for Nonpoint-Source Pollution Control
6. River Water Quality Modeling
7. Intensive River Survey in River Water Quality Modeling
8. Modeling of Subsurface Contaminant Transport
9. Estuary, Coastal and Marine Water Modeling