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2.3 Uncertainties in Water Pollution Problems2.3.1 Aleatory Uncertainties or Randomness; 2.3.2 Epistemic or Man-induced Uncertainties; 2.4 Water Quality Specifications; 2.4.1 Water Quality Standards; 2.4.2 Effluent Standards; 2.5 Probabilistic Risk and Reliability; 2.6 Fuzzy Risk and Reliability; 2.7 Questions and Problems - Chapter 2; 3 Risk Quantification; 3.1 Stochastic Approach; 3.1.1 Direct Evaluation; 3.1.1.1 Margin of Safety; 3.1.1.2 The Safety Factor; 3.1.2 Second-Moment Formulation; 3.1.3 Frequency Analysis of Data; 3.1.3.1 Probability Distribution of Extremes
3.1.3.2 Analysis of Frequency3.1.4 Stochastic Modelling; 3.1.4.1 Deterministic Modelling; 3.1.4.2 Stochastic Modelling; 3.1.5 Monte Carlo Simulation; 3.2 Fuzzy Set Theory; 3.2.1 Fuzzy Regression; 3.2.1.1 Fuzzy Regression as an Extension of Interval Analysis; 3.2.1.2 Statistical Regression; 3.2.1.3 Interval Regression; 3.2.1.4 Fuzzy Regression; 3.2.2 Fuzzy Modelling; 3.3 Time Dependence and System Risk; 3.3.1 Failure and Reliability Functions; 3.3.2 Failure Rate and Hazard Function; 3.3.3 Expected Life; 3.3.4 System Risk and Reliability; 3.3.4.1 Series Systems; 3.3.4.2 Parallel Systems
3.4 Questions and Problems - Chapter 34 Risk Assessment of Environmental Water Quality; 4.1 Risk in Coastal Water Pollution; 4.1.1 Uncertainties in Coastal Water Quality Processes; 4.1.2 Mathematical Modelling; 4.1.2.1 Molecular Diffusion; 4.1.2.2 Turbulent Diffusion; 4.1.2.3 Turbulent Dispersion; 4.1.2.4 Growth Kinetics; 4.1.2.5 Coastal Circulation; 4.1.3 Random Walk Simulation; 4.1.4 Dispersion by Wind-generated Currents; 4.2 Risk in River Water Quality; 4.2.1 Introduction; 4.2.2 Mathematical Modelling and Simulation; 4.2.2.1 Physically Based Mathematical Models
4.2.2.2 Numerical Simulation

Sommario/riassunto

This new edition of a classic text has now been extensively updated to include the latest developments in risk analysis and water quality assessment and management. It takes into account the role of ecological water quality in integrated regional and transboundary water resources management, according to the latest UNESCO programmes and the new EU-Water Framework Directive. This practice-oriented textbook is a unique tool for identifying and evaluating local and regional environmental risks from pollution hazards in groundwater, river water and coastal seawaters. The book explains differ