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stress; 3.3 Basic definitions; 3.4 Structure of the section; 3.5 Appendix A - Application: buoyancy force exerted on a submerged air bubble; Spherical bubble; Bubble rise velocity in still water; Bubble rise velocity in a non-hydrostatic pressure gradient; 3.6 Appendix B - Freshwater properties; 3.7 Exercises; 3.8 Exercise solutions; 4. Turbulent shear flows; 4.1 Presentation; Summary; DISCUSSION; The Couette flow; 4.2 Jets and wakes; Discussion; 4.3 Boundary layer flows; Velocity distribution; Applications
Turbulent boundary layer development along a smooth flat plate4.4 Fully developed open channel flows; 4.5 Mixing in turbulent shear flows; 4.5.1 Presentation; 4.5.2 Discussion: effects of contaminants on shear flows; 4.6 Exercises; 4.7 Exercise solutions; 5. Diffusion: basic theory; 5.1 Basic equations; Summary; 5.2 Applications; 5.2.1 Initial mass slug; DISCUSSION; 5.2.2 Initial step function C[sub(m)](x, 0); 5.2.3 Sudden increase in mass concentration at the origin; DISCUSSION; 5.2.4 Effects of solid boundaries; 5.3 Appendix A - Mathematical aids; Differential operators; Error function
NotationConstants; Mathematical bibliography; 5.4 Exercises; 5.5 Exercise solutions; 6. Advective diffusion; Summary; 6.1 Basic equations; 6.2 Basic applications; 6.2.1 Advective diffusion of a sharp front; 6.2.2 Initial mass slug introduced at t = 0 and x = 0; 6.2.3 Transverse mixing of two streams with different concentrations; 6.2.4 Sudden mass contamination in a river; 6.3 Two- and three-dimensional applications; 6.4 Exercises; 6.5 Exercise solutions; 7. Turbulent dispersion and mixing: 1. Vertical and transverse mixing; Summary; 7.1 Introduction; 7.2 Flow resistance in open channel flows
7.3 Vertical and transverse (lateral) mixing in turbulent river flows

Sommario/riassunto

Environmental Hydraulics is a new text for students and professionals studying advanced topics in river and estuarine systems. The book contains the full range of subjects on open channel flows, including mixing and dispersion, Saint-Venant equations method of characteristics and interactions between flowing water and its surrondings (air entrainment, sediment transport).Following the approach of Hubert Chanson's highly successful undergraduate textbook Hydraulics of Open Channel Flow, the reader is guided step-by-step from the basic principles to more advanced practical applicatio