SECTION A: OPEN-CHANNEL FLOW

1. INTRODUCTION
- 1.1 Classification
- 1.2 Normal flow
- 1.3 Flow energy: fluid head
- 1.4 Froude number

2. RAPIDLY-VARIED FLOW
- 2.1 Hydraulic jump
- 2.2 Specific energy
- 2.3 Critical-flow devices
- 2.4 Forces on objects

3. GRADUALLY-VARIED FLOW
- 3.1 Normal flow vs gradually-varied flow
- 3.2 Derivation of the gradually-varied-flow equation
- 3.3 Finding the friction slope
- 3.4 Profile classification
- 3.5 Qualitative examples of open-channel-flow behaviour
- 3.6 Numerical solution of the GVF equation

4. WAVE SPEED AND ANALOGY WITH COMPRESSIBLE FLOW
- 4.1 Long-wave speed on shallow water
- 4.2 Zone of influence
- 4.3 Analogy with compressible flow

Recommended Textbooks

Chanson, H., 2004, *Hydraulics of Open Channel Flow: An Introduction*, 2nd Edition, Butterworth-Heinemann, ISBN 978-0750659789

Massey, B., and Ward-Smith, J., 2011, *Mechanics of Fluids*, 9th Edition, (Revised by Ward-Smith, J.), CRC Press, ISBN 978-0415602600

White, F.M., 2021, *Fluid Mechanics*, 9th Edition, McGraw-Hill, ISBN 978-1260575545

Chadwick, A.J., Morfett, J.C., and Borthwick, M., 2021, *Hydraulics in Civil and Environmental Engineering*, 6th Edition, CRC Press, 978-0367460891