1.061 / 1.61 Transport Processes in the Environment
Fall 2008

Measuring Velocity in a Channel

BEFORE coming to lab:
1. ☐Purchase a lab notebook with duplicating paper.
2. ☐Read handout *Why a Lab Notebook*
3. ☐Read the handout *Evaluation of Uncertainty*.
4. ☐One estimate of velocity, U, is the flow rate, Q, divided by the cross-sectional area, A. In one page of clearly worded prose describe the uncertainty in U given the uncertainty in Q and A. One copy of this will be **handed in at the beginning of lab**, and one copy should be included in your lab notebook.
5. ☐Read handout *Why a Lab Notebook*.
6.

YOU WILL HAND IN THE COPY PAGES OF YOUR
LAB NOTEBOOK AT THE END OF LAB.

Estimating Flow in a Channel

Goals: Measure the mean velocity in the laboratory flume using two different methods, and determine whether these estimates agree within the uncertainty.

Outline for Lab Notebook:

Record Experimental Set-up and Procedure
1. ☐In your lab notebook make a sketch of the experimental set-up. Be sure to include sufficient detail so that someone could recreate the experiment from your sketch.
2. ☐Use the acoustic Doppler velocimeter (ADV) to measure the velocity in the channel. Record the vertical and lateral position of the measuring volume in the channel. What is the uncertainty in this measurement?
3. ☐Think of two additional and independent ways to estimate U and describe each method in your lab notebook. Record the equations you will use to estimate U and to propagate the error in each measurement to your estimate of U.
4. ☐Record the necessary observations with uncertainty.
5. ☐Record the resulting estimate of U with uncertainty.
6. ☐Discussion – Use complete sentences. Clarity counts!
    Do the three estimates of velocity agree?
    Which estimate is best?
    How do the estimates differ? e.g. Lagrangian vs. Eulerian?
    For the two methods chosen in part 3, indicate which observed quantity contributes the most uncertainty to U?

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