

1. Summarize calibration data for the salinity sensor
 - a. Fill in the table using n Arduino readings for each concentration:

Wt% NaCl	n	Mean	Standard Dev. (σ)	Median
0.00%				
0.05%				
0.10%				
0.15%				

- b. Compute $\Delta UCL = \Delta LCL = 3\sigma =$ _____
2. Obtain piecewise linear equations to compute the salinity as a function of Arduino reading. This equation will be provided using the inverse curve fit to calibration data. Make sure you have at least 5 digits for each coefficient.

The piece wise curve fits are for two ranges of salinity: one linear curve fit for salinity between 0 and 0.05%, and another linear curve fit between 0.05% and 0.15%. Using the reverse curve fits, you will therefore, have two equations of the form:

$$S = c_1 r + c_2$$

where S is the salinity in wt %, r is the *averaged* raw analog input value for the voltage divider, and c_1 and c_2 are the coefficients of the piecewise curve fit. The value of r should be the result of averaging 5 to 10 individual readings with a short delay (say 5 to 10 milliseconds) between readings.

3. Measure the mass flow rate (in g/s) through the solenoid valves when the valves are open.
 - a. Measure the mass of water accumulated in a time Δt . Make sure that during time Δt , valves are alternatively opening and closing at a rate of 1 cycle (on/off) per 2 seconds or faster. *time on = time off* for each cycle. Note: Mass flow rate is calculated using only the time when valves are opened.
 - b. Repeat the measurement at least 5 times for each solenoid valve.
 - c. Compute the mean mass flow rate and standard deviation for each valve
4. Measure the response time of your system
 - a. Choose method A or method B as described in the detailed notes.
 - b. Fill your flow loop with DI water
 - b. Fill the salty supply reservoir with water having 0.15% salinity concentration water
 - c. Measure how long (in seconds) it takes between the moment you add salty water and the moment where reading values stabilize on your serial monitor. Note that if you use method A, you should add a small delay between readings to make it easier note the time at which the disturbance is added and the time at which the system attains its new equilibrium.
5. Write equation to obtain Δt_v (time valve should be open) as a function of initial salt concentration and set point.
6. Display status of system on LCD panel
7. Implement control algorithm in Arduino code