Qualitative Model of Salinity Control

This document is an aid to studying concepts in the salinity control algorithm for the fish tank. After implementing the salinity control system, you should be able to identify common terms in the development of the control algorithm, and use the diagrams in this document to explain fish tank performance.

Figure 1 is an intentionally incomplete composite of three signals during operation of a fish tank. Table 1 is a list of labels that you should be able to apply to features of Figure 1. Figure 2 shows the behavior of a fish tank that does a better job of controlling salinity than the fish tank represented by Figure 1

Practice

1. Label the axes of Figure 1
2. Add labels from Table 1 to Figure 1.
3. In what way is the fish tank represented by Figure 2 better than the fish tank represented by Figure 1?

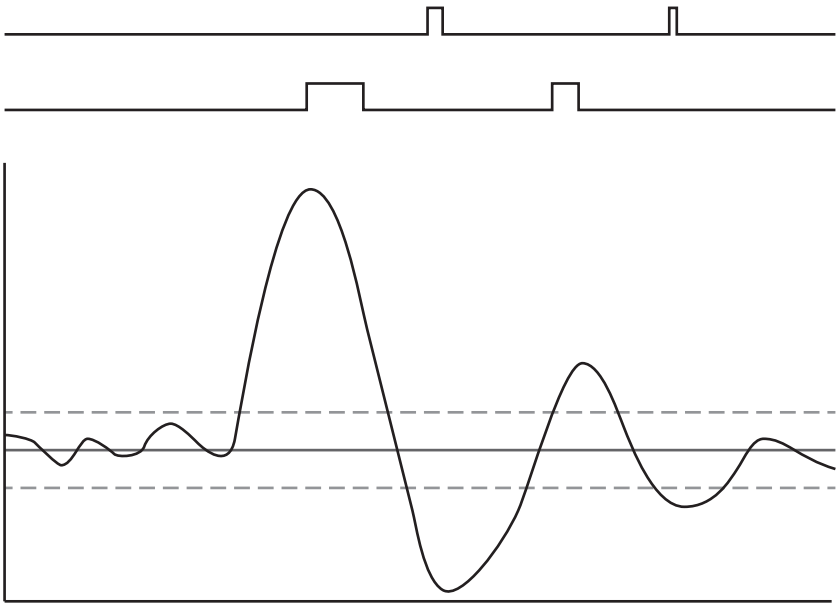

Figure 1 Intentionally incomplete plot of the behavior of an automatic salinity control algorithm for the fish tank. Note that the behavior of the control algorithm is not ideal.

Table 1 Terms and labels to be added to Figure 1.

Salinity	Time	set point
LCL	UCL	DI valve
Salty valve	overshoot	error
External disturbance	deadband	

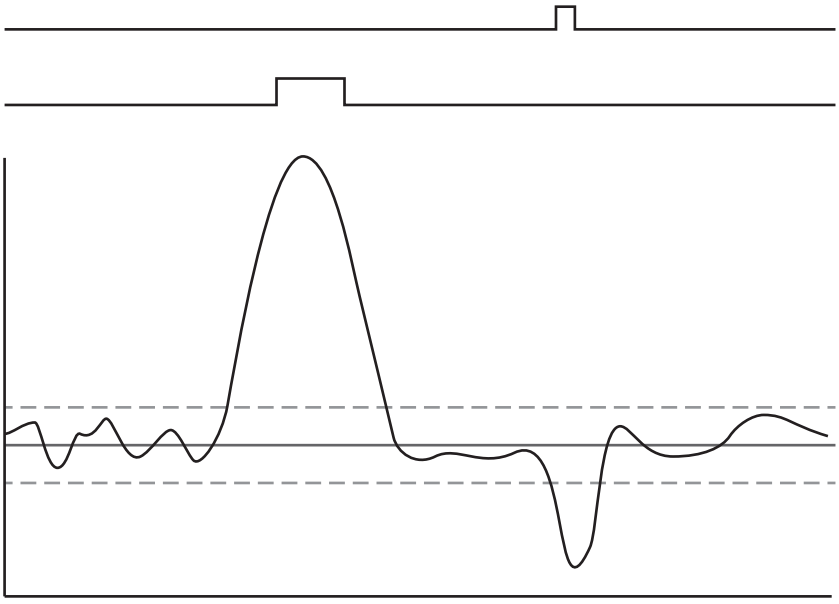

Figure 2 Intentionally incomplete plot of the behavior of an automatic salinity control algorithm for the fish tank. The behavior of the control algorithm that created the response depicted in this plot is objectively better than the behavior depicted in Figure 1.