

Introduction: Sample outline of report

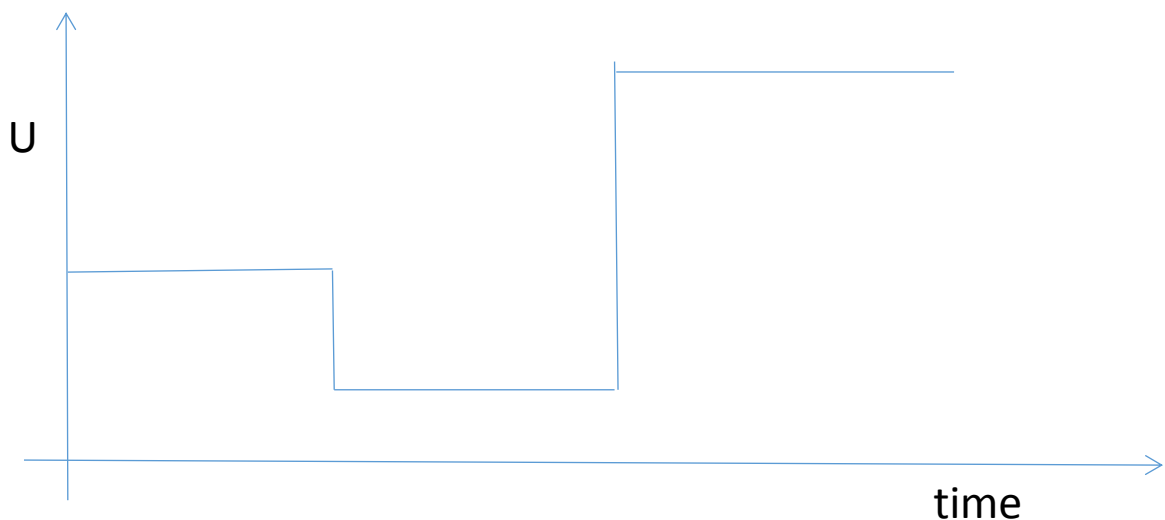
Write a few lines on what you think the whole ACW is about. For example you could say you are investigating the simulation of a robot, and developing an intelligent agent to track the movement of this robot. The agent is predicting the movement of the robot. You could also use your initiative to sketch a simple diagram for this.

This section conveys your understanding of the whole ACW and not just the individual parts. This contributes to your later parts and should reflect on the conclusions for the each part and mark there

Part I

For this part - please include the code in the appendix (do not upload the whole of the visual studio solution!)

Here you can start with the model of a robot. Suggest that the robot has a set of inputs U , say what they are. Plot this as a function of time.



Outline the simulation algorithm. In this algorithm you will need to include the logic for change of U with the integrations.

1. Use at least five different values of h . You could start from 1, then use 0.75, .5, 0.25, 0.01, 0.001. In each case plot the results on the same graph

(axes). On this graph you could plot the exact solution. For this example the exact solution is

$$x(t) = U(t) - e^{-2t}$$

Compare the results. An effective way to compare them is to plot them.

Note: you should comment on the computation effort required as h is changed, generally the error is of the order of h, i.e reduce error by half change h to h/2

Then using the theoretical discussion suggest the upper limit for h. If this h has not been taken, use it and show what happens.

2. For writing to file the data to use for later parts of the ACW, use h=0.01

Part II

This part should be straight forward. Again attach code in the appendix. In the report, you need to say why you are using random numbers here (i.e. what is the purpose). Explain why you need to generate these in a normal distribution. The think to note here is that the noise you are generating is called white noise, which is being added to the values in the simulation. This represents all the noise present in the sensors (at various points of the system).

Answer the questions raised in the ACW spec.

You will need to plot the original data, and the data with noise added.

Part III

This part of the report again the code in appendix.

The report should have a brief description of the learning algorithm. A few lines on why you are testing with different past samples present in the model. (these past samples represent the dynamics of robot and the noise in the system)

A brief discussion why a perceptron does not track at all. The explain the change to a neuron approach (i.e, change the transfer function) and show that it starts tracking. A few plots with different learning rates, and a discussion of fine tuning the results should be sufficient to explain this.

Conclusion

Finally, you will need to write a conclusion to the overall ACW. Avoid repetition: focus on (a) what is it you are testing, and (b) what is it you learned etc.