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15/SC1091002

CHE 532

Test

Solution.

- 1) The first step is to incorporate the data on excel into a matlab work space by:-
 - 1) opening a new command window on matlab
 - 2) Go to "work space" and choose "new variable".
 - 3) Rename it as "input".
 - 4) Copy input data (flowrate (f_i)) from excel file
↓
paste it in the variable
 - 5) Repeat same for output data (dynamic height (h))
in a new variable named "output".

The next step is to simulate the ~~tank~~ system using Simulink.

Blocks needed:-

- 1) Inport block
- 2) NNPC (Neural Network predictive control) block
- 3) Subsystem block
- 4) A Clock block
- 5) An X2Y block
- 6) A To file block

1) Inport

i) open the inport block window

ii) Select connect input

iii) Select signals, "New MAT. File."

iv) Specify set point data in MAT. file
 $h_{set} = 2.5$

2 NNPC block

- i) Double clicked NNPC block to open block window.
- ii) Selected plant identification.
- iii) Selected import data in the plant identification window.

iv) Select "Arrays" as type of data.

v) Import from "Work Space".

vi) Specify input Array as "input".

vii) Specify output Array as "output".

viii) click "Okay".

ix) In the plant identification window, fill in the "Training Samples" block with value 1502.

Fill in the other boxes with the following assumptions:

Size of hidden layer = 3

Sampling interval = 0.1

Maximum plant input = 1

Minimum plant input = 0

Training epochs = 500 (using function trainm)

x) click on Train data.

xi) On the window containing input, plant output error, NN output graphs, click on accept data.

xii) Configure the Neural Network Predictive Control using the following assumptions.

Cost Horizon (N_c) = 8

Control Horizon (N_u) = 2

Control weighing factor = 0.01

Search parameter = 0.001

xiii) click apply.

Control System Connection.

