

Grupo 3

Participantes:

David Arias Calderón 20181020149

Luis Miguel Polo 20182020158

Taller 2 Ejercicio 5

Enunciado

Implementar un sistema de control predictivo neuronal para una planta con la siguiente función de transferencia:

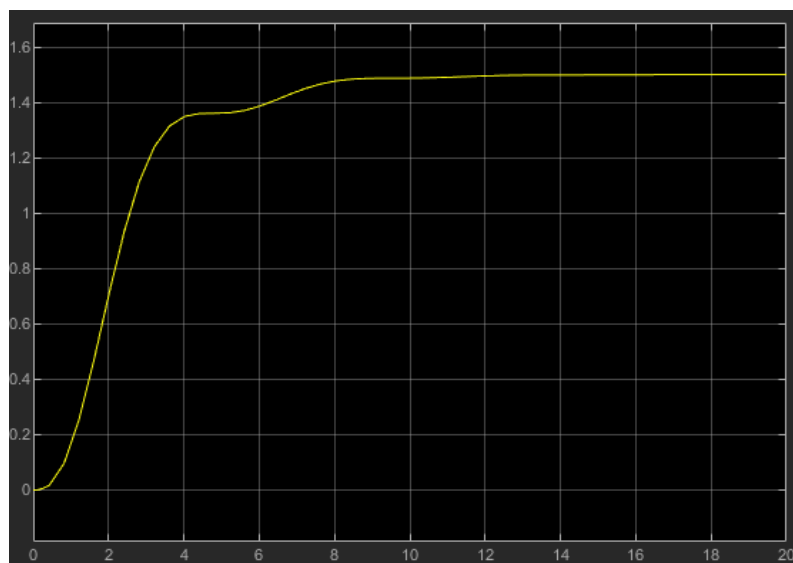
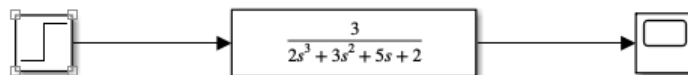
$$G(s) = \frac{3}{2s^3 + 3s^2 + 5s + 2}$$

Requerimientos de diseño

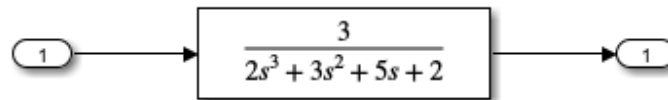
- Entrada de referencia escalón unitario $\mu(t)$.
- Oscilación en estado estable inferior al 10%.

Solución

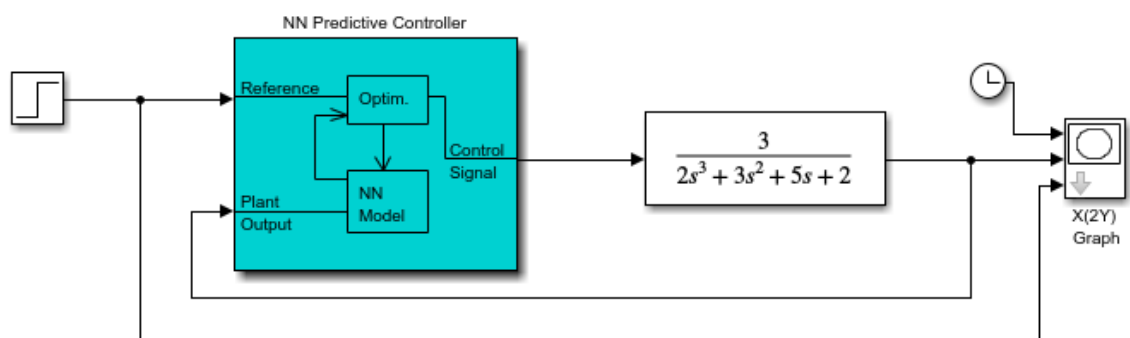
Gráfica de la función de transferencia



Modelo de la planta



Sistema de control predictivo neuronal en simulink



Configuración del sistema de control

File Window Help

Neural Network Predictive Control

Cost Horizon (N2)	7	Control Weighting Factor (\)	0.01
Control Horizon (Nu)	5	Search Parameter (\)	0.001
Minimization Routine	csrchbac	Iterations Per Sample Time	2
Plant Identification		OK	Cancel
Perform plant identification before controller configuration.			

Plant Identification

Network Architecture

Size of Hidden Layer	5	No. Delayed Plant Inputs	3
Sampling Interval (sec)	0.05	No. Delayed Plant Outputs	3

☒ Normalize Training Data

Training Data

Training Samples	800	<input type="checkbox"/> Limit Output Data	
Maximum Plant Input	4	Maximum Plant Output	Inf
Minimum Plant Input	0	Minimum Plant Output	-Inf
Maximum Interval Value (sec)	6	Simulink Plant Model:	Browse
Minimum Interval Value (sec)	1	ModeloPlanta1	

Generate Training Data
Import Data
Export Data

Training Parameters

Training Epochs	800	Training Function	trainlm
-----------------	-----	-------------------	---------

☒ Use Current Weights
 ☐ Use Validation Data
 ☐ Use Testing Data

Train Network
OK
Cancel
Apply

Configuración de salida

Block Parameters: X(2Y) Graph
✕

X(2Y) scope. (mask)

X(2Y) scope using MATLAB graph window. First input is used as time base. Enter plotting ranges.

Parameters

x-min:

0

x-max:

40

y-min:

0

y-max:

1.5

Sample time:

-1

Gráfica resultante de la simulación

