

Grupo 3

Participantes:

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Taller 2 Ejercicio 6

Enunciado

Implementar un sistema de control neuronal NARMA-L2 para una planta con la siguiente función de transferencia:

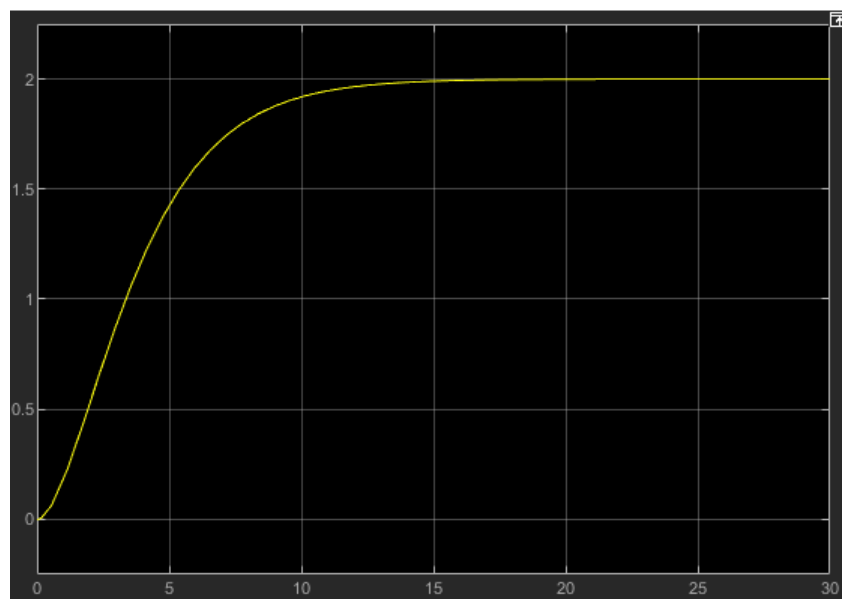
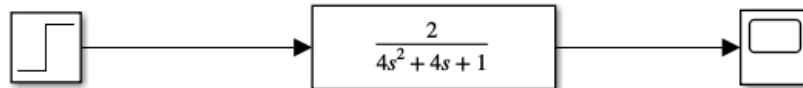
$$G(s) = \frac{2}{4s^2 + 4s + 1}$$

Requerimientos de diseño

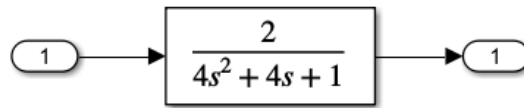
- Entrada de referencia escalón unitario $\mu(t)$.
- Oscilación en estado estable inferior al 10%.

Solución

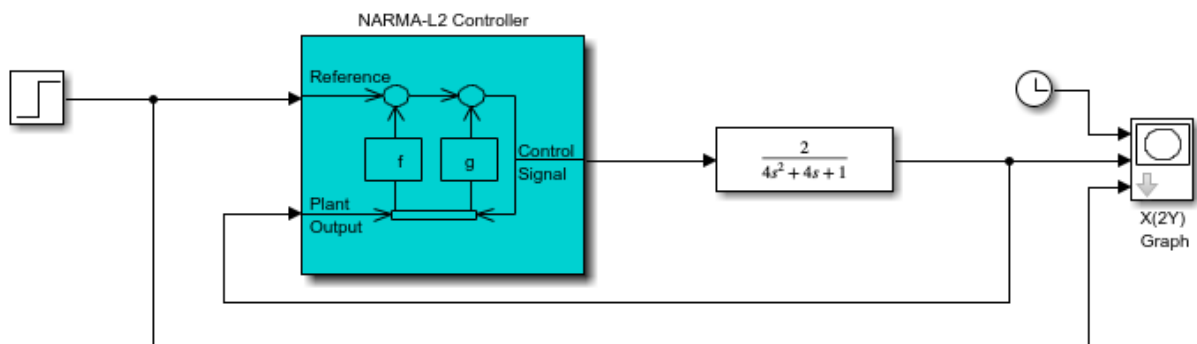
Scope de la función de transferencia en simulink



Modelo de la planta



Sistema de control neuronal NARMA-L2



Configuración de NARMA-L2

Plant Identification - NARMA-L2

File Window Help

Plant Identification - NARMA-L2

Network Architecture

Size of Hidden Layer	5	No. Delayed Plant Inputs	2
Sampling Interval (sec)	0.05	No. Delayed Plant Outputs	2

☒ Normalize Training Data

Training Data

Training Samples	800	<input type="checkbox"/> Limit Output Data	
Maximum Plant Input	2	Maximum Plant Output	Inf
Minimum Plant Input	0	Minimum Plant Output	-Inf
Maximum Interval Value (sec)	10	Simulink Plant Model:	Browse
Minimum Interval Value (sec)	1	ModeloPlanta3	

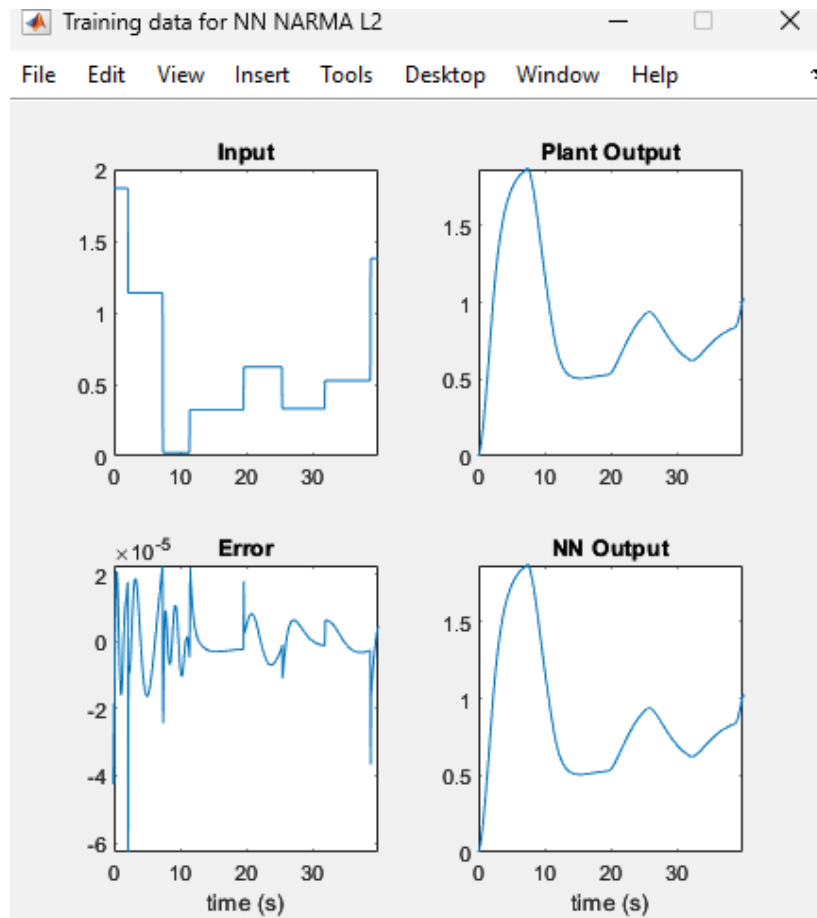
Generate Training Data Import Data Export Data

Training Parameters

Training Epochs	800	Training Function	trainlm
<input checked="" type="checkbox"/> Use Current Weights	<input type="checkbox"/> Use Validation Data	<input type="checkbox"/> Use Testing Data	

Train Network OK Cancel Apply

Entrenamiento de datos para NARMA-L2



Entrenamiento de red neuronal

Training Results

Training finished: Reached maximum number of epochs

Training Progress

Unit	Initial Value	Stopped Value	Target Value
Epoch	0	800	800
Elapsed Time	-	00:00:05	-
Performance	1.42	6.64e-11	0
Gradient	4.67	4.62e-07	1e-10
Mu	0.001	1e-08	1e+10
Validation Checks	0	0	6

Training Algorithms

Data Division: Levenberg-Marquardt `trainlm`

Performance: Mean Squared Error `mse`

Calculations: MATLAB

Salida en simulink

