# Introduction of neural network in MATLAB

TA

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# Syntax & Description

Remember to install ‘‘Deep Learning Toolbox’’.

1. [Y,Xf,Af] = sim(net,X,Xi,Ai,T)
   - Simulate neural network.
   - sim is usually called implicitly by calling the neural network as a function.
   - For instance, these two expressions return the same result: y = sim(net,x,xi,ai) & y = net(x,xi,ai).
2. net = feedforwardnet(hiddenSizes,trainFcn)
   - Generate feedforward neural network.
   - hiddenSize: Size of the hidden layers in the network; 10 (default).
   - trainFcn: Training function name; 'trainlm' (default).
3. trainedNet = train(net,X,T)
   - Train shallow neural network
   - X: Network inputs; T: Network targets.

# Example: Construct and Train a Feedforward Neural Network (1/2)

- Load the training data.

```
7 | [x, t] = simplefit_dataset;
```

- Construct a feedforward network with one hidden layer of size 10.

```
10 | net = feedforwardnet(10);
```

- Train the network net using the training data.

```
13 | net = train(net, x, t);
```

- Estimate the targets using the trained network.

```
16 | y = net(x);
```

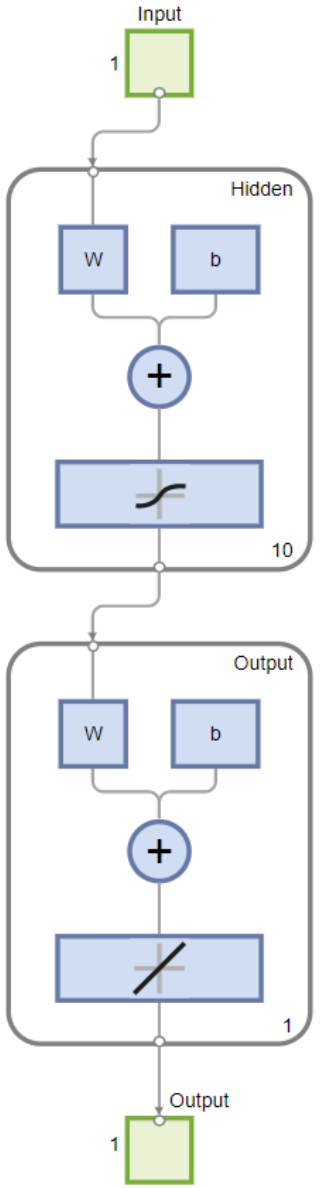
# Example: Construct and Train a Feedforward Neural Network (2/2)

```
19 | view(net);
```

- View the trained network.

```
22 | perf = perform(net, y, t)
```

- Assess the performance of the trained network. The default performance function is mean squared error.




perf =

2.0078e-05

**Training Results**

Training finished: Met validation criterion

**Training Progress**

| Unit | Initial Value | Stopped Value | Target Value |
|---|---|---|---|
| Epoch | 0 | 19 | 1000 |
| Elapsed Time | - | 00:00:00 | - |
| Performance | 30.4 | 1.07e-06 | 0 |
| Gradient | 83.7 | 0.00347 | 1e-07 |
| Mu | 0.001 | 1e-07 | 1e+10 |
| Validation Checks | 0 | 6 | 6 |

**Training Algorithms**

| | | |
|---|---|---|
| Data Division: | Random | dividerand |
| Training: | Levenberg-Marquardt | trainlm |
| Performance: | Mean Squared Error | mse |
| Calculations: | MEX | |

# Reference


1. https://www.mathworks.com/help/deeplearning/ref/feedforwardnet.html?s_tid=doc_ta
2. https://www.mathworks.com/help/deeplearning/ref/network.train.html?s_tid=doc_ta
3. https://www.mathworks.com/help/deeplearning/ref/sim.html?s_tid=doc_ta