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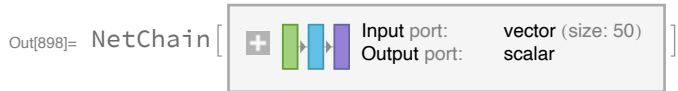
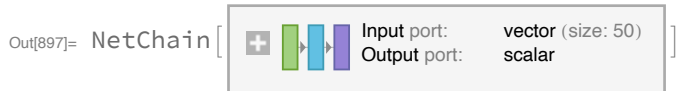
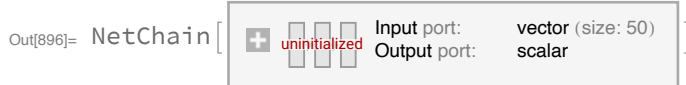
MTH540/440 - EAS621/622 - DSC550 Discussion Session

September 23, 2020

Topic: Time Series Prediction Numerical Experiment.

See the discussion video in mycourses.

```
In[892]:= ClearAll["Global`*"]
f[x_] := Exp[-x^2] * Sin[15 * Pi * x] - x * Cos[0.5 * Pi * x]
(*f[x_] := Exp[-x^2] * Sin[15 * Pi * x] - x * Cos[0.5 * Pi * x] + x * Sin[2 * Pi * x]*)
x = Table[x, {x, -1, 1, 0.005}];
ww = 50;
net = NetChain[{10, 10, 10, 10, 10, 10, 1}, "Input" -> ww, "Output" -> "Scalar"]
NetInitialize[net]
net = NetTrain[net,
  f[Partition[x[[;; -2]], ww, 1]] -> f[x[[ (ww + 1) ;; ]]], MaxTrainingRounds -> 10000]
```



```

In[899]:= g1 := Plot[f[x], {x, -1, 2}, ImageSize → Large, PlotStyle → Red, GridLines → {{1}, {}}]
g2 := ListPlot[Thread[{x, f[x]}], ImageSize → Large];
xe = x[[-ww ;;]];
fe = f[x[[-ww ;;]]];
Do[
  xe = AppendTo[xe, Last[xe] + 0.005];
  fe = AppendTo[fe, net@fe[[-ww ;;]]];
  , {i, 1, 200}];
xe = xe[[(ww + 1) ;;]];
fe = fe[[(ww + 1) ;;]];
g3 := ListPlot[Thread[{xe, fe}], ImageSize → Large, PlotStyle → Black];
Show[g1, g2, g3]

```

