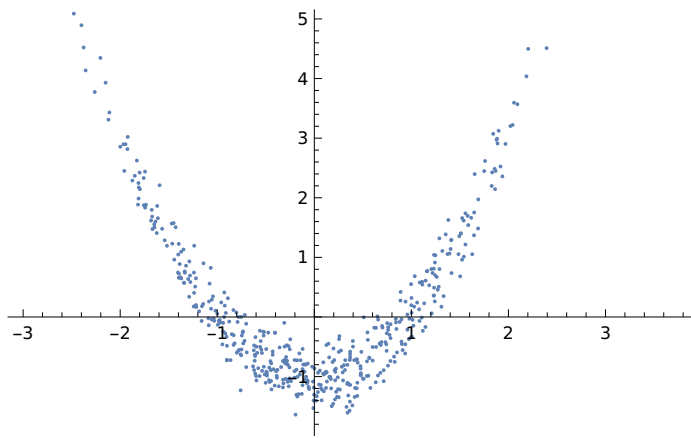In[1]:= `xs = RandomReal[NormalDistribution[], 500];`

In[2]:= `ys = xs^2 - 1 + RandomReal[NormalDistribution[0, 0.3], 500];`

In[3]:= `ListPlot[Transpose[{xs, ys}]]`

Out[3]=

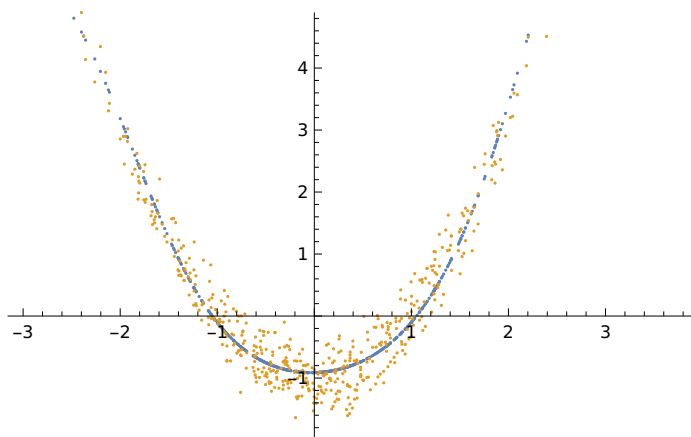In[4]:= `tdata = {#1} → {#2} & @@@ Transpose[{xs, ys}];`

In[6]:=
```
net = NetTrain[NetInitialize[
      NetChain[{LinearLayer[2], Tanh, LinearLayer[1]}, "Input" → 1],
      Method → {"Xavier", "FactorType" → "Mean", "Distribution" → "Normal"}
      ],
      tdata,
      LossFunction → MeanSquaredLossLayer[],
      MaxTrainingRounds → 2000,
      Method → "ADAM"];
```

In[7]:=
```
ListPlot[{
   {#, net[{#}][[1]]} & /@ Sort@xs,
   Transpose[{xs, ys}]
  }]
```
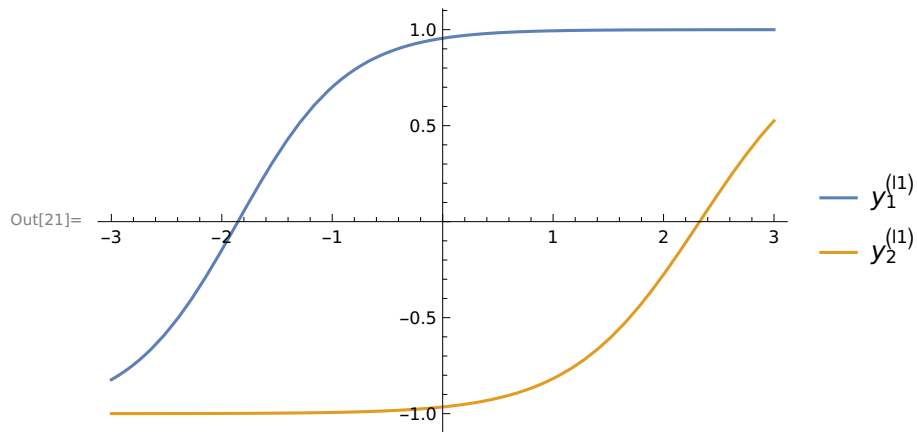
Out[7]=

In[8]:= `{{L1w11} , {L1w21}} = NetExtract[net, {1, "Weights"}];`
`{L1b1, L1b2} = NetExtract[net, {1, "Biases"}];`
`{{L2w11, L2w12}} = NetExtract[net, {3, "Weights"}];`
`{L2b1} = NetExtract[net, {3, "Biases"}];`

In[21]:= `Plot[{Tanh[L1w11 x + L1b1], Tanh[L1w21 x + L1b2]}, {x, -3, 3},`
  `PlotLegends → {"y₁⁽ˡ¹⁾", "y₂⁽ˡ¹⁾"}]`

In[13]:= **L2w11**

Out[13]= -3.9174

In[14]:= **L2w12**

Out[14]= 6.54133

In[25]:= `Plot[{L2w11 Tanh[L1w11 x + L1b1],`
   `L2w12 Tanh[L1w21 x + L1b2],`
   `L2w11 Tanh[L1w11 x + L1b1] + L2w12 Tanh[L1w21 x + L1b2],`
   `L2w11 Tanh[L1w11 x + L1b1] + L2w12 Tanh[L1w21 x + L1b2] + L2b1`
  `}, {x, -3, 3},`
  `PlotRange → {{-3, 3}, {-11, 5}},`
  `PlotLegends → {`
    `"`$w_{11}^{(l2)} y_1^{(l1)}$`",`
    `"`$w_{21}^{(l2)} y_2^{(l1)}$`",`
    `"`$w_{11}^{(l2)} y_1^{(l1)} + w_{21}^{(l2)} y_2^{(l1)}$`",`
    `"`$w_{11}^{(l2)} y_1^{(l1)} + w_{21}^{(l2)} y_2^{(l1)} + b_1^{(l2)} = y_1^{(l2)}$`"}]`

Out[25]=

Legend:
- $w_{11}^{(l2)} y_1^{(l1)}$
- $w_{21}^{(l2)} y_2^{(l1)}$
- $w_{11}^{(l2)} y_1^{(l1)} + w_{21}^{(l2)} y_2^{(l1)}$
- $w_{11}^{(l2)} y_1^{(l1)} + w_{21}^{(l2)} y_2^{(l1)} + b_1^{(l2)} = y_1^{(l2)}$