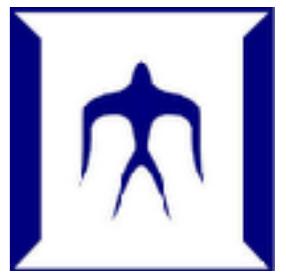
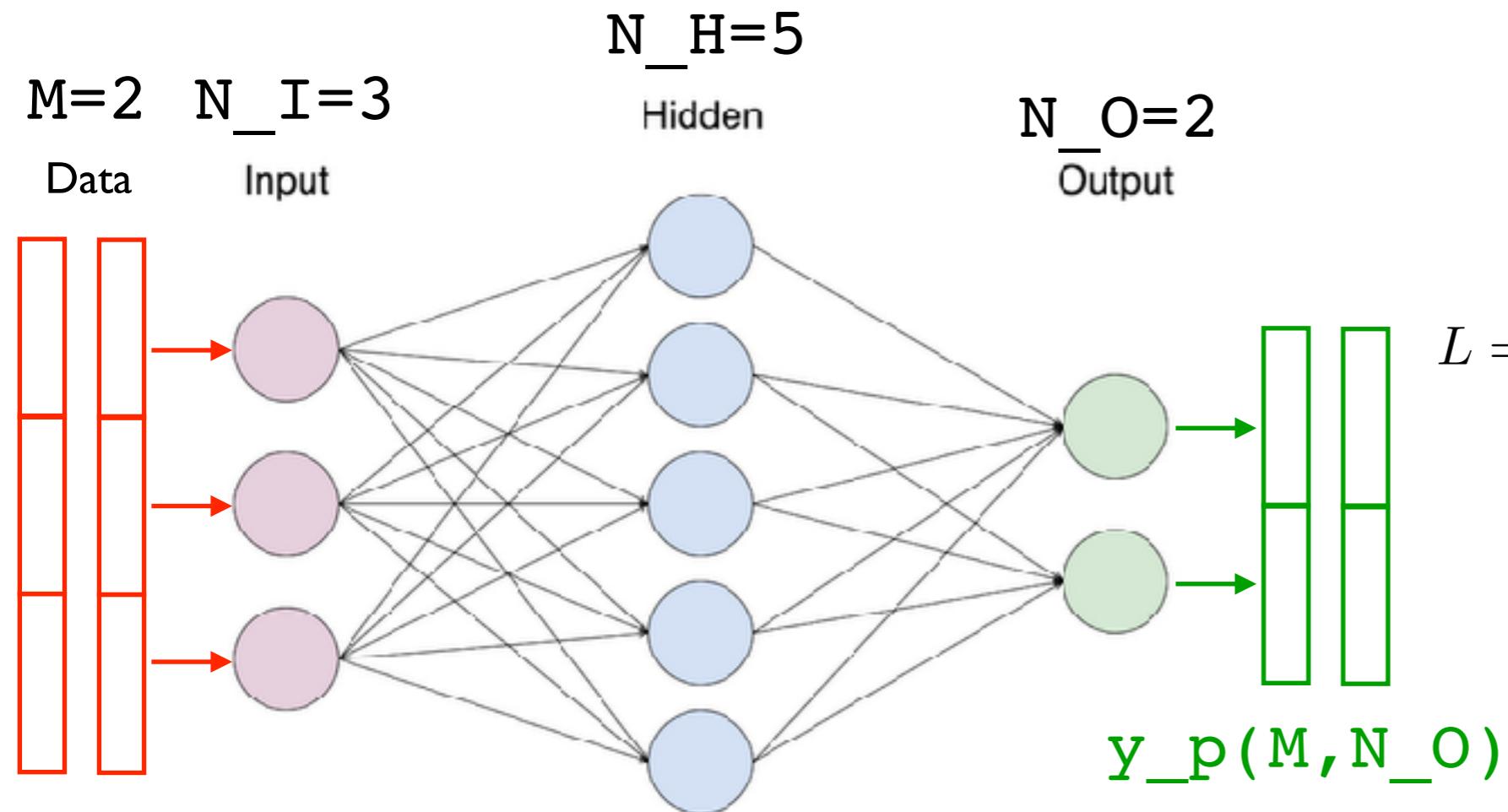


Chainer



High Performance Scientific Computing 2018
Rio Yokota

Deep Learning



$$x(M, N_I) \quad h_r = f(x * w_1) \quad y_p = h_r * w_2$$

$$w_1(N_I, N_H) \quad w_2(N_H, N_O)$$

$$L = \frac{1}{N_O} \sum (y_p - y)^2$$

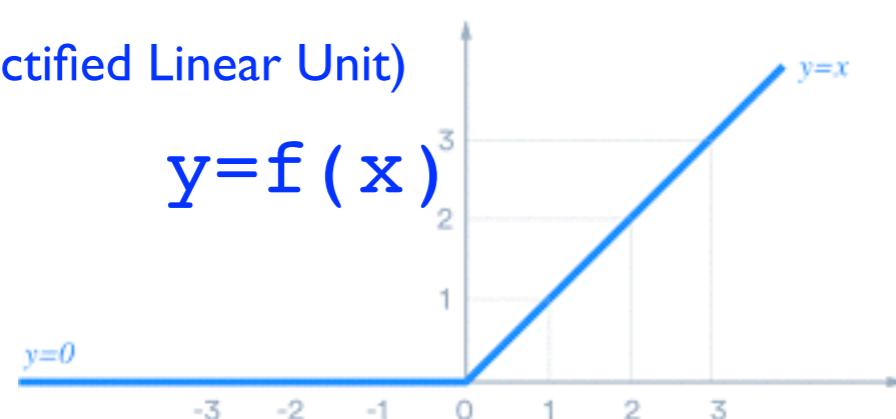
$$w_2 \leftarrow w_2 - \eta \frac{\partial L}{\partial w_2}$$

$$w_1 \leftarrow w_1 - \eta \frac{\partial L}{\partial w_1}$$

Back propagation

ReLU (Rectified Linear Unit)

$$y = f(x)$$



$$\frac{\partial L}{\partial w_2} = \frac{\partial L}{\partial y_p} \frac{\partial y_p}{\partial w_2} = \frac{1}{N_O} 2(y_p - y) h_r$$

$$\frac{\partial L}{\partial w_1} = \frac{\partial L}{\partial y_p} \frac{\partial y_p}{\partial h_r} \frac{\partial h_r}{\partial w_1} = \frac{1}{N_O} 2(y_p - y) w_2 x \quad h_r > 0$$

Chainer

Setup:

```
> module load python-extension/3.6
```

How to run:

```
> cd hpc_lecture/chainer  
> python 00_numpy.py  
> python 01_variable.py  
> python 02_chain.py  
> python 03_optimizer.py  
> python 04_training.py
```

References:

https://orizuru.io/blog/machine-learning/deeplearning_chainer-01/