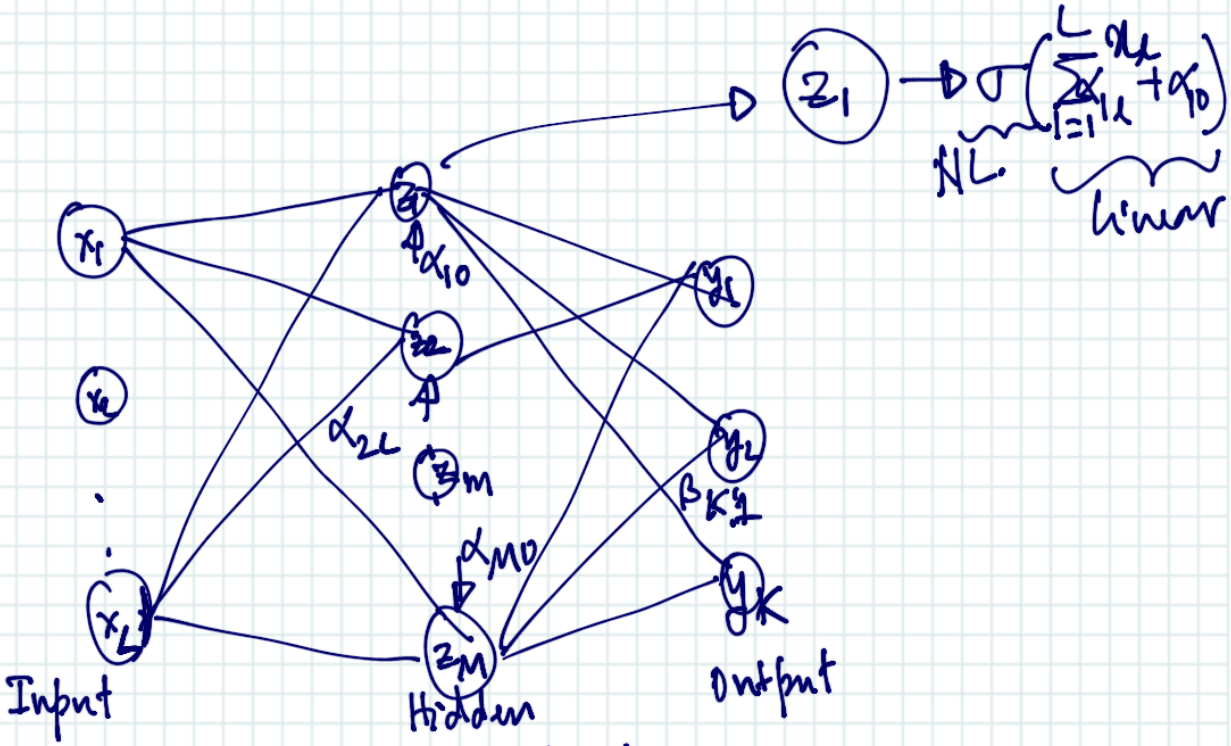
30/9/2019

EE5801: Representation Learning

- Review
- NN based approaches
  - Supervised
  - unsupervised

Review ANN:



A fully connected network

α_{ml} : weight connecting hidden node m to input node l

β_{km} : weight connecting output node k to hidden node m.

$\sigma(\cdot)$: non-linearity at the hidden node.

α_{m0} : bias at hidden node m.

$$z_m = \sigma\left(\sum_{l=1}^{L} \alpha_{ml} x_l + \alpha_{m0}\right)$$

$$\text{with } \hat{y}_k = \frac{e^{(T_k)}}{\sum_{j=1}^{K} e^{(T_j)}}$$

$$R(\theta) = \frac{1}{N} \sum_{i=1}^{N} \underbrace{\left[f(x^{(i)}; \underline{\theta}) \right]}_{\hat{y}^{(i)}(\theta)} - \underline{y}^{(i)} \Big]^2 \quad \text{(MSE loss)}$$