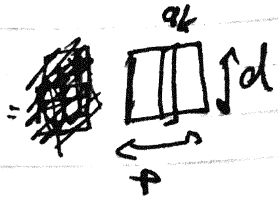
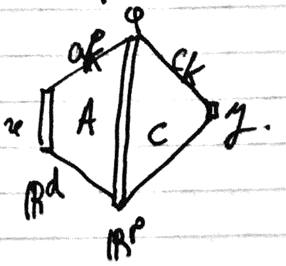
$\boxed{\text{MLP}}$ (1 couche cachée)

Data $(x_i, y_i)_{i=1}^{n}$, $x_i \in \mathbb{R}^d$, $y_i \in \mathbb{R}$, prédire $y = f(x)$ en fittant $y_i \approx f(x_i)$.

ici $f(x) = \sum_k c_k \varphi(\langle x, a_k \rangle) = \varphi(A^T x)\, c$



$$\min_{A,c} \frac{1}{n} \sum_{i=1}^{n} | f(x_i) - y_i |^2$$



X = 

$$\underbrace{\varphi\Big[\underbrace{\underbrace{X}_{\mathbb{R}^{n\times d}} \times \underbrace{A}_{\mathbb{R}^{d\times p}}}_{\mathbb{R}^{n\times p}}\Big] \times c}_{\in \mathbb{R}^n}$$

Pbm : $\min_{(A,c)} E(A,c) \triangleq \frac{1}{2} \| \varphi(XA)c - y \|^2$

$R(A,c)$

Q° : $\nabla_c E(A,c) = \varphi(XA)^T \big(\overbrace{\varphi(XA)c - y}^{e} \big)$.

$\nabla_A E(A,c) = X^T \big[\varphi'(XA) \odot R(A,c)\, c^T \big]$