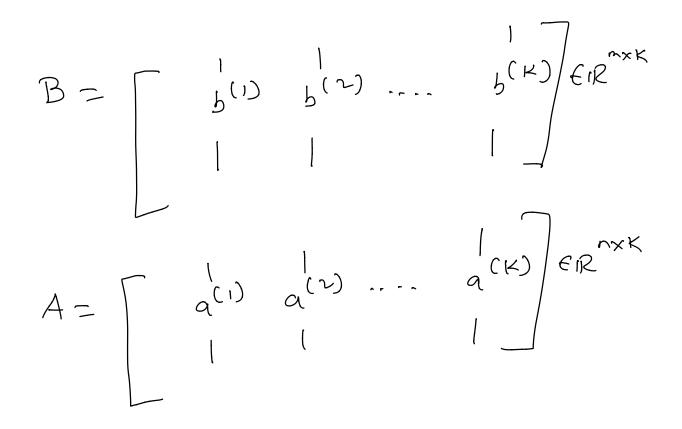
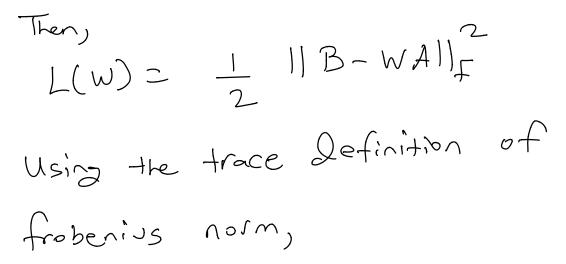
$\int L(w) = \frac{1}{2} \int \frac{K}{16} ||b^{(i)} - Wa^{(i)}||_{2}^{2}$

Recall that for a mutrix XER^{mxn} $||X1|_{f}^{2} = \sum_{i=1}^{m} \sum_{j=1}^{2} (X_{ij})^{2}$ $= \sum_{j=1}^{2} \frac{||X(:,j)||_{2}^{2}}{|X_{j}|_{2}}$ $\sum_{j=1}^{2} \frac{|X_{j}(:,j)|_{2}}{|X_{j}|_{2}}$ $\sum_{j=1}^{2} \frac{|X_{j}(:,j)|_{2}}{|X_{j}|_{2}}$ So if we define the following

matrices





$$L(w) = \frac{1}{2} Tr \left[(B - wA)^{T} (B - wA) \right]$$

$$= \frac{1}{2} Tr \left[B'B - B'WA - A'W'B + A'W'WA \right]$$

Dropping the terms that has no W dependence and observing Tr [BTWA] = Tr[(BTWA)] = Tr[ATWTB]

 $L(w) = -Tr[A^{T}w^{T}B] + \frac{1}{2}Tr[A^{T}w^{T}wA]$ we have

