In the paper, Exponentiated Gradient Exploration for Active Learning by Djaner Bouneffouf 2015 as attached, an exponential gradient (EG)-active random exploration strategy that can improve the active learning performance is proposed. Read the paper, and answer the questions in no more than 100 words each.

a) What is the role of $\in -\text{active algorithm } 1?$
$(\text{e.g. the functional purpose of this algorithm})$

Improve the result of any active learning algorithm.

b) The equation (2) the reward formula {$\cos^{-1}$(d(h1lh2) should be $\cos^{-1}$(d(h1, h2) and d(h, h') $\in [1,1]$ should be d(h, h') $\in [-1,1]$}. Explain the role of the reward used in random exploration of selecting unlabeled samples. If cosine similarity score between two hypotheses is high, then the reward is low, otherwise the reward is high. Why?

The reward is used to increase the probability of a specific ε.

The reward is measured by variation of the hypotheses. The higher cosine similarity score means the angle between two vector is small, that is high similarity are between two vector, so the reward is low. On the contrary, two vectors are vary leading to smaller cosine score and the reward is high.

c) In algorithm 2 EG-active the last step formula updating the sampling probability p_k, there is some confusion, it cannot guarantee the value is between 0 and 1, Please revise it as you wish to make it a probability and also suitable normalize update for weights.

[Note the k in (1-k) should not be the same as the k in k/T because otherwise it will be negative value when k>1]

The last step adapt to $p_k = (1-p_k)(\frac{w_k}{\sum_{j=1}^{T} w_j} + \frac{T}{k}), k = 1,...,T$