

## SML

### Practice

Q1. What will be principal component vectors when data is sampled from identity covariance matrix?

Q2. Suppose  $x$  is a random vector and  $w$  is a fixed vector. Let  $y = w^\top x$ , and  $n$  iid samples from the distribution of  $y$  are available. Find  $E(y)$  and  $var(y)$ . Let  $x$  follows a multi-variate Gaussian and  $y$  follows a uni-variate Gaussian. Let the mean  $\mu$  and covariance  $S$  of  $x$  be known. Find an expression for likelihood in terms of  $y, w, S, \mu$ . Find MLE for  $w$ . There may not be a closed form for  $w$ . In that case you can find derivative wrt  $w$  and leave it at there.