

# ABE6933 SML HW9

## Directions

Please submit **one PDF** file including all your reports (answer + code + figures + comments; must be easily readable and have file size under a few megabytes) and **one R code script**. The R script is supplementary material to ensure that your code runs correctly. If you are using RMarkdown, please also include your `.Rmd` file.

Place these two (or three) files in a folder, make a zip or rar archive, and submit the archive electronically via Dropbox file request at [tinyurl.com/nbliznyuk-submit-files](https://www.dropbox.com/request/ABE6933SMLHW9) (on the landing page, enter your name so that we know it is you and email so that you get a confirmation).

For the full list of rules/policies/expectations, please visit “hw.rules.pdf” document.

**Deadline:** 22-Nov-2020, 11:59 PM EST.

## Practice/Optional Problems (do not submit)

1. Complete the R tutorial for the ISLR chapters 9 and 10. You may find the Youtube videos by Trevor Hastie helpful; for links, see file `!_youtube_lab_links.txt` in the subfolder `"[2].code/islr_labs/"`
2. ISLR ch.09: 1
3. ISLR ch.10: 8
4. Optional typed problems:
  - (a) In Lab 9.6.3, try to reproduce ROC curves by hand by varying the threshold  $t$  in the classification boundary  $f(x)=t$ . Plot the true positive (TP) rate vs  $t$ , false positive (FP) rate vs  $t$ , and  $TP(t)$  vs  $FP(t)$ .
  - (b) In the USArrests data, use the R function `svd()` to recover the output of `princomp` (PC sdev, scores and loadings) as discussed in the PCA lecture
  - (c) Watch a Youtube video below about "eigenfaces" for an intuitive application of PCA to face recognition:

<https://www.youtube.com/watch?v=jQ0ZrXZTXcw>

[https://www.youtube.com/watch?v=\\_lY74pXWlS8](https://www.youtube.com/watch?v=_lY74pXWlS8)

## Required Problems (for submission)

ISLR ch.09: 2,3,5,8

ISLR ch.10: 3,9,10