Exercise 12

Import notebook funcs

from notebookfuncs import *

- 12. This problem involves simple linear regression without an intercept.
- (a) Recall that the coefficient estimate for the linear regression of Y onto X without an intercept is given by (3.38). Under what circumstance is the coefficient estimate for the regression of X onto Y the same as the coefficient estimate for the regression of Y onto X?
- (b) Generate an example in Python with n=100 observations in which the coefficient estimate for the regression of X onto Y is different from the coefficient estimate for the regression of Y onto X.
- (c) Generate an example in Python with n=100 observations in which the coefficient estimate for the regression of X onto Y is the same as the coefficient estimate for the regression of Y onto X.
 - This has already been proved and shown in my answer to Exercise 11 where the coefficients are calculated as $\rho * \frac{SD(y)}{SD(x)}$ and its inverse.
 - The ratios of the standard deviations are inversed when the regressions are inversed.
 - When the two variables are standardize bed and have unit variance or SD, then their coefficient estimate $\hat{\beta}$ are the same as the Pearson correlation coefficient ρ .

Examples have been generated for the same in Exercise 11.

allDone();

<IPython.lib.display.Audio object>