Quiz 6 - Week #6

Due No due date **Points** 20 **Questions** 10 **Time Limit** None

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	7 minutes	20 out of 20

Score for this quiz: **20** out of 20
Submitted Feb 17 at 4:32pm
This attempt took 7 minutes.

Question 1

2 / 2 pts

(1) The correlation between two orthogonal predictor variables is:

- a. 1.0
- b. 0.0 — Correct!
- c. 0.5
- d. Correlation does not exist.

Question 2

2 / 2 pts

(2) Consider a regression model with predictor variables X1, X2, and X3. If X1 has a VIF value of 2, then the R-Squared value from regressing X1 on X2 and X3 is:

- a. 0.0

b. 0.25

c. 0.75

Correct!

d. 0.50

Question 3

2 / 2 pts

(3) How can multicollinearity affect regression models?

a. Unstable regression coefficients, i.e. regression coefficients, will change sign as variables are added or deleted from the model.

b. Estimates of regression coefficients will have large variances.

c. Regression coefficients will show as statistically significant when they should not.

Correct!

d. Regression coefficients will be both unstable, i.e. regression coefficients will change sign as variables are added or deleted from the model, and have large variances.

Question 4

2 / 2 pts

(4) Diagnostics for multicollinearity include:

a. The Overall F-Test

b. Variance Inflation Factors

c. The condition index for the X'X matrix

Correct!

d. Both variance inflation factors and the condition index for the X'X matrix.

Question 5

2 / 2 pts

(5) Suppose we have 5 variables: X1, X2, X3, X4, and X5 in a data set with 2000 observations. We use the covariance matrix to compute the principal components. How many principal components are there?

a. 2

Correct!

b. 5

c. 2000

d. 400

Question 6

2 / 2 pts

(6) Consider a linear regression model with the predictor variables X1, X2, and X3. If we regress X1 on the other two predictor variables X2 and X3 and get an R-Squared value of 0.25, then the corresponding Variance Inflation Factor (VIF) for X1 is:

a. 0.25

b. 0.50

c. 0.66

Correct!

d. 1.33

Question 7

2 / 2 pts

(7) Given the variables X1, X2, X3, X4, and X5. The eigenvector associated with the largest eigenvalue is (0.5,0,-0.2,0,0.7). How do we compute the first principal component?

- a. 0.2*(X1 + X2 + X3 + X4 + X5)
- b. 0.5*X5 – 0.2*X3 + 0.7*X1
- c. 0.2*(X1 + X2 + X3 + X4 + X5)/5
- d. 0.5*X1 – 0.2*X3 + 0.7*X5

Correct!

Question 8

2 / 2 pts

(8) If the sum of the eigenvalues is 90 and the second eigenvalue is 15, how much of the variance is explained by the second principal component?

- a. 85.0%
- b. 16.7%
- c. 15.0%
- d. 12.5%

Correct!

Question 9

2 / 2 pts

(9) True/False: Multicollinearity will always render our predictive models to be poor performing.

True

Correct!

False

False – The effects of multicollinearity primarily affect statistical inference, e.g. consider the variance inflation factor. The predictive effects of multicollinearity will differ from model to model, or sample to sample. Recall the JUNK model from Assignment #5. That model performs quite well in the predictive sense even though it has highly collinear variables to the point that it is almost an absurd model, hence the name JUNK. We evaluate predictive models within the predictive modeling framework, and we do that for a reason – because inference and prediction are different modeling approaches with different considerations.

Question 10

2 / 2 pts

(10) Multicollinearity can be detected by:

a. the Overall F-test

b. a t-test

Correct!

c. a variance inflation factor

d. a leverage value

Quiz Score: **20** out of 20