Homework 2 (4300)

Due Thursday October 3 by 3 pm

★ Turn in a hardcopy of your explanations, necessary output, and R code by the due date and time.

Job Satisfaction Data. Three measures of job satisfication are obtained from a survey instrument given to employees. Another survey instrument is also given to supervisors to assess corresponding job characteristics. The researcher wants to examine the correlations between job characteristics (X - variety, feedback, autonomy) and measures of employee satisfaction (Y - career, supervisor, financial).

H.2.1 Use the **Job Satisfaction Data**.

(a) Give the overall F-test results and R^2 values for the 3 univariate multiple linear regressions of each measure of employee satisfaction (Y) given all job characteristics (X). For each of the 3 model fits, interpret the R^2 values and *explain* which satisfaction responses have linear associations in the populaton with the job characteristics at the 0.05 level using the overall F-test.

(b) Obtain the multivariate tests results of the 3 job characteristic variables. Give the null and alternative *statistical hypotheses* for these 3 tests. Provide the statistical decisions and practical conclusions of these 3 tests at the 0.05 level.

H.2.2 Use the **Job Satisfaction Data**.

(a) Give the first canonical correlation value and explain what it represents in this application.

(b) Give the test results of the canonical correlations. *Explain* which population canonical correlations should be declared to be non-zero.

(c) Give the standardized canonical coefficients. Interpet the first canonical variate using the coefficients.

(d) Give the cross correlations between the variables and the canonical variates (2 sets). Which variables have a linear associations with the first canonical variate? Use a cut-off of 0.5 for the magnitude (absolute value) of the correlation.

Job Satisfaction Data

Y Variables (Employee Satisfaction)

career track satisfaction: employee satisfaction with career direction and the possibility of future advancement, expressed as a percent

supervisor satisfaction: employee satisfaction with supervisor's communication and management style, expressed as a percent

financial satisfaction: employee satisfaction with salary and other benefits, using a scale measurement from 1 to 10 (1=unsatisfied, 10=satisfied)

X Variables (Job Characteristics)

task *variety*: degree of variety involved in tasks, expressed as a percent

feedback: degree of feedback required in job tasks, expressed as a percent

autonomy: degree of autonomy required in job tasks, expressed as a percent

R-Code

```
datv = scan()
72 26 9 10 11 70
63 76 7 85 22 93
96 31 7 83 63 73
96 98 6 82 75 97
84 94 6 36 77 97
66 10 5 28 24 75
31 40 9 64 23 75
45 14 2 19 15 50
42 18 6 33 13 70
79 74 4 23 14 90
39 12 2 37 13 70
54 35 3 23 74 53
60 75 5 45 58 83
63 45 5 22 67 53

dat = matrix(datv,14,6,byrow=T)

Y = as.matrix(dat[,1:3]);
colnames(Y) = c("career","supervisor","finance")

X = as.matrix(dat[,4:6]);
colnames(X) = c("variety","feedback","autonomy")

n = nrow(dat); p = ncol(Y); m = ncol(X);
```