# 10.2

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(1)

From table 10.17, the following equation can be got:
1. $C_1 = 0.500\widetilde{X_1} + 0.484\widetilde{X_2} + 0.718\widetilde{X_3}$
2. $C_2 = -0.697\widetilde{X_1} + 0.717\widetilde{X_2} + 0.002\widetilde{X_3}$
3. $C_3 = 0.514\widetilde{X_1} + 0.501\widetilde{X_2} - 0.696\widetilde{X_3}$ where: 4. $\widetilde{X_1} = X_1; \widetilde{X_2} = X_2; \widetilde{X_3} = X_3$
From table 10.18:
5. $Y = 0.67C_1 - 0.02C_2 - 0.56C_3$ Put equations $1, 2, 3$ and 4 into equation 5, we can get the final model. Then an estimate of is zero. $Y = 0.061X_1 + 0.029X_2 + 0.871X_3$

(2)

From the three eigenvalues of the correlation matrix of the three predictor variables, we can get the condition index by the ratio of maximum eigenvalue and minimum eigenvalue. The condition index is 193, much larger than 100. So, there exists collinearity.

(3)

Equation: $R^2 = \frac{SS_{reg}}{SS_{\text{total}}}$ where $SS_{reg}$ indicates the sum of squares of regression and $SS_{\text{total}}$ indicates the sum of squares of all. The result is 0.8753

(4)

The equations: $C_1 = 0.500X_1 + 0.484X_2 + 0.718X_3$

From the test results in Table 10.18, the coefficient of $C2$ and $C3$ are not significant, so the final model is: $Y_1 = 0.67C1$ where $C_1 = 0.500\widetilde{X_1} + 0.484\widetilde{X_2} + 0.718\widetilde{X_3}$