Stats 541 Assignment 2 James Young

**Problem 1**

**1. State the Problem**

(from p. 312) A study of the effect of different types of anesthesia on the length of postoperative hospital stay yielded the following for cesarean patients: Group A was given an epidural MS. Group B was given an epidural. Group C was given a spinal. Group D was given general anesthesia. The data are presented in Table 6.28. In general, the general anesthetic is considered to be the most dangerous, the spinal somewhat less so, and the epidural even less, with the MS addition providing additional safety. Note that the data are in the form of distributions for each group.

**2. What is the Appropriate Test**

The appropriate model is ANOVA and F test

**3. Test Equation**

Where = jth 𝑜𝑏𝑠𝑒𝑟𝑣𝑒𝑑 𝑠𝑎𝑚𝑝𝑙𝑒 𝑣𝑎𝑙𝑢𝑒 𝑓𝑟𝑜𝑚 𝑡ℎ𝑒 𝑖 𝑡ℎ 𝑝𝑜𝑝𝑢𝑙𝑎𝑡𝑖𝑜𝑛, 𝜇 = 𝑟𝑒𝑓𝑒𝑟𝑒𝑛𝑐𝑒 𝑣𝑎𝑙𝑢𝑒 (𝑜𝑣𝑒𝑟𝑎𝑙𝑙 𝑚𝑒𝑎𝑛) = 𝑒𝑓𝑓𝑒𝑐𝑡 𝑜𝑓 𝑎𝑛 𝑜𝑏𝑠𝑒𝑟𝑣𝑎𝑡𝑖𝑜𝑛 𝑏𝑒𝑖𝑛𝑔 𝑖𝑛 𝑡ℎ𝑒 𝑖 𝑡ℎ 𝑝𝑜𝑝𝑢𝑙𝑎𝑡𝑖𝑜𝑛 𝑤ℎ𝑖𝑐ℎ 𝑖𝑠 𝑡ℎ𝑒 𝑑𝑖𝑓𝑓𝑒𝑟𝑒𝑛𝑐𝑒 𝑏𝑒𝑡𝑤𝑒𝑒𝑛 𝑡ℎ𝑒 𝑚𝑒𝑎𝑛 𝑜𝑓 𝑡ℎ𝑒 𝑖th 𝑝𝑜𝑝𝑢𝑙𝑎𝑡𝑖𝑜𝑛 𝑎𝑛𝑑 𝑡ℎ𝑒 𝑟𝑒𝑓𝑒𝑟𝑒𝑛𝑐𝑒 𝑣𝑎𝑙𝑢𝑒 (𝑡ℎ𝑎𝑡 𝑖𝑠, 𝜇𝑖 − 𝜇), 𝑎𝑛𝑑 = 𝑑𝑖𝑓𝑓𝑒𝑟𝑒𝑛𝑐𝑒 (𝑑𝑒𝑣𝑖𝑎𝑡𝑖𝑜𝑛, 𝑟𝑒𝑠𝑖𝑑𝑢𝑎𝑙) 𝑜𝑓 𝑡ℎ𝑒 𝑗th 𝑜𝑏𝑠𝑒𝑟𝑣𝑒𝑑 𝑣𝑎𝑙𝑢𝑒 𝑓𝑟𝑜𝑚 𝑖𝑡𝑠 𝑟𝑒𝑠𝑝𝑒𝑐𝑡𝑖𝑣𝑒 𝑝𝑜𝑝𝑢𝑙𝑎𝑡𝑖𝑜𝑛 𝑚𝑒𝑎𝑛.

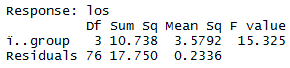
**4. State the Assumptions**

1. The specified model and its parameters adequately represent the behavior of the data

2. The ’s are normally distributed random variables with mean zero and common variance .

3. The ’s are independent in the probability sense (the value of one does not affect another ).

**5. State the Hypothesis**

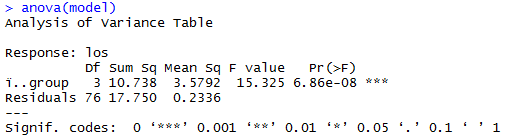
**6. Calculate the Test Statistic**

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**7. Decision Rule**

**8. Interpretation of Results**

**9. Deccision Rule**



10. Levene’s test for Homogeneity

**Problem 2**

1. **State The Problem**

The data shown in Table 6.35 relate to the effectiveness of several insecticides. One hundred insects of a particular specieswere put into a chamber and exposed to an insecticide for 15 s. The procedure was applied in random order six times for each of four insecticides. The response is the number of dead insects. Based on these data, can you make a recommendation? Check assumptions!

1. **What is the Appropriate Test**

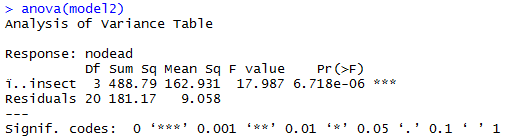
The appropriate test is the ANOVA test

1. **Test Equation**
2. **State The Assumptions**

1. The specified model and its parameters adequately represent the behavior of the data

2. The ’s are normally distributed random variables with mean zero and common variance .

3. The ’s are independent in the probability sense ( the value of one does not affect another ).

**5. State the Hypothesis**

**6. Calculate the Test Statistic**

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R Code

