SAS Lab 1

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Access SAS

Please read the note (https://www.stat.purdue.edu/~zhanghao/STAT514/SAS_Code/) on multiple ways to access SAS. I recommend two ways.

1. If you like to use SAS when you do not have the Internet access, then install SAS software on your PC or Linux system. https://communityhub.purdue.edu/storefront/product/sas_personal (https://communityhub.purdue.edu/storefront/product/sas_personal). Note there is no Mac version.
2. Whenever you can access the Internet, you can use the brower version of SAS by visiting http://goremote.itap.purdue.edu/ (http://goremote.itap.purdue.edu/).

Note that if you're off-campus, you'll first need to connect to campus through a VPN in order to use the brower version: https://www.itap.purdue.edu/connections/vpn/ (https://www.itap.purdue.edu/connections/vpn/).

Look/search for "SAS 94 English", and save it as a favorite for faster future access

Randomization

```
*Randomization;
data design1;
input treatment @@;
randomv=ranuni(1234);
lines;
1 1 1 1 2 2 2 2 3 3 3 3
;
proc print data=design1;
run;
proc sort data=design1;
by randomv;
proc print;
run;
```

Percentiles and Critical Values

```
* Program to calcualte percentiles of chi-square distribution;
data chisq;
input prob df;
percentile=cinv(prob, df);
lines;
0.05 9
0.95 9
;
proc print data=chisq;
run;

data t;
input prob df;
percentile=tinv(prob, df);
lines;
0.05 9
0.95 9
;
proc print data=t;
run;

data f;
input prob df1 df2;
percentile=finv(prob, df1,df2);
lines;
0.05 2 9
0.95 2 9
;
proc print data=f;
run;
```

An Example of Analysis Using SAS

The Prius Experiment

In an experiment to study the effects of drivers on the mpg of Toyota Prius, 12 new Prius were randomly assigned to three drivers so that each driver drove four cars and obtained the mpgs. This is a completely randomized design. The data are given below.

$d1$	$d2$	$d3$
50.33	48.11	49.08
46.83	50.14	48.89
51.57	43.22	49.96
45.33	47.26	49.70

1. The SAS program to get the sample means and sample standard deviations:

```
data prius;
input driver mpg;
lines;
1 50.33
1 46.83
1 51.57
1 45.33
2 48.11
2 50.14
2 43.22
2 47.26
3 49.08
3 48.89
3 49.96
3 49.70
;
run;
proc print data=prius;
run;

proc means data=prius;
by driver;
run;
```

2. Find an estimate of the variance σ^2.

The estimate is given by the MSE:

$$\begin{aligned} MSE &= \frac{1}{n-v}\sum_{i=1}^{3}(r_i-1)s_i^2 \\ &= \frac{1}{12-3}(3*2.92^2+3*2.90^2+3*0.51^2) \\ &= 5.75. \end{aligned}$$

3. Find the 95% confidence upper limit for σ^2.

   First we need to find the 5^{th} percentile for the χ^2-distribution with $n-v=9$ degrees of freedom, which equals $\chi^2_{9,0.95}=3.325$. The 95% confidence upper limit is given by $\frac{SSE}{\chi^2_{9,0.95}}=\frac{9*5.75}{3.325}=15.55$.

One-Way ANOVA

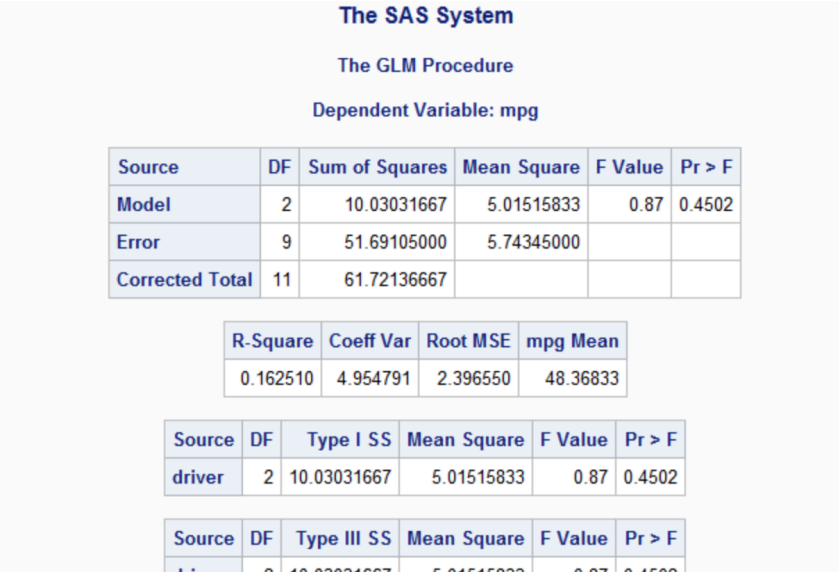
The ANOVA for the Prius experiment can be carried out in SAS as follows.

```
proc glm data=prius;
class driver;
 model mpg=driver/solution;
 lsmeans driver;
 means driver;
 run;
```

The option `solution` will produce more output information such as the sample means and sample standard deviations.

The option "ss1 ss3" will produce more output information such as the sample means and sample standard deviations.

Partial output:



The SAS System

The GLM Procedure

Dependent Variable: mpg

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10.03031667	5.01515833	0.87	0.4502
Error	9	51.69105000	5.74345000		
Corrected Total	11	61.72136667			

R-Square	Coeff Var	Root MSE	mpg Mean
0.162510	4.954791	2.396550	48.36833

Source	DF	Type I SS	Mean Square	F Value	Pr > F
driver	2	10.03031667	5.01515833	0.87	0.4502

Source	DF	Type III SS	Mean Square	F Value	Pr > F

Activity Details

Task: View this topic