\*Week 13 Live session;

\*Echolocation example;

FILENAME REFFILE '/home/sadiet0/Echolocation.csv';

PROC IMPORT DATAFILE=REFFILE

DBMS=CSV

OUT=echolocation;

GETNAMES=YES;

RUN;

proc print data = echolocation;

run;

\*To log the data;

data echolocation;

set echolocation;

lenergy = log(energy);

lmass = log(mass);

run;

proc print data = echolocation;

run;

\*To run the model with interaction;

proc glm data = echolocation;

class type (ref = "non-echolocating bats");

model lenergy = lmass | type /solution;

run;

\*To run the model without interaction;

proc glm data = echolocation;

class type (ref = "non-echolocating bats");

model lenergy = lmass type /solution;

run;

\*To run the model without interaction with different reference;

proc glm data = echolocation;

class type (ref = "echolocating bats");

model lenergy = lmass type /solution;

run;

data critval;

cv=quantile("t", 0.975, 20-4);

run;

proc print data = critval;

run;

\*To run the model without interaction with different reference;

proc glm data = echolocation plots = all;

class type (ref = "echolocating bats");

model lenergy = lmass type /solution;

run;

\*Recode for covariance matrix;

data echolocation;

set echolocation;

bird = 0;

if (type = "non-echolocating birds") then bird = 1;

ebat = 0;

if (type = "echolocating bats") then ebat = 1;

nebat = 0;

if (type = "non-echolocating bats") then nebat = 1;

run;

\*Covariance matrix;

proc reg data = echolocation;

model lenergy = lmass bird ebat / covb;

run;

\*Covariance matrix;

proc reg data = echolocation;

model lenergy = lmass bird nebat / covb;

run;

\*SAT GPA example;

\*To get p-value;

data pval;

pv=1-probf(4.89, 3, 27);

run;

proc print data = pval;

run;

\*Overfit example;

data r2example;

input x y;

datalines;

1 2

2 8

3 7

4 12

5 11

6 8

;

run;

\*simple linear regression model;

proc reg data = r2example;

model y = x;

run;

\*To produce the power variables;

data r2example2;

set r2example;

x2 = x\*x;

x3 = x\*x\*x;

x4 = x\*x\*x\*x;

x5 = x\*x\*x\*x\*x;

;

proc print data = r2example2;

run;

\*To fit a 4th degree polynomial;

proc reg data = r2example2;

model y = x x2 x3 x4;

run;

\*To fit a 5th degree polynomial;

proc reg data = r2example2;

model y = x x2 x3 x4 x5;

run;

proc glm data = r2example;

model y = x | x | x | x | x / solution;

run;

\*Crab example;

FILENAME REFFILE '/home/sadiet0/Crab17.csv';

PROC IMPORT DATAFILE=REFFILE

DBMS=CSV

OUT=crab;

GETNAMES=YES;

RUN;

proc print data = crab;

run;

proc sort data = crab;

by species;

run;

data crab;

set crab;

height2 = height\*\*2;

height3 = height\*\*3;

height4 = height\*\*4;

height5 = height\*\*5;

height6 = height\*\*6;

;

proc reg data = crab;

by species;

where (species = "Lophopanopeus bellus");

model force = height height2 height3 height4 height5 height6;

run;

\*bluefin example;

/\* Curvature \*/

data bluefin;

input age length;

datalines;

1 67

1 62

2 109

2 83

2 91

2 88

3 137

3 131

3 122

3 122

3 118

3 115

3 131

3 143

3 142

2 123

3 122

4 138

4 135

4 146

4 146

4 145

4 145

4 144

4 140

4 150

4 152

4 157

4 155

4 153

4 154

4 158

4 162

4 161

4 162

4 165

4 171

5 171

4 162

4 169

4 167

5 188

2 100

2 109

4 150

3 140

4 170

3 150

4 140

4 140

4 150

4 150

3 140

3 150

3 150

4 150

4 160

3 140

4 150

5 170

4 150

5 150

4 150

4 150

3 150

5 150

5 160

4 140

5 160

3 130

4 160

3 130

4 170

6 170

4 160

5 180

4 160

4 170

;

run;

data bluefin;

set bluefin;

age2 = age\*\*2;

run;

proc sort data = bluefin;

by age;

run;

proc reg data = bluefin;

model length = age age2;

run;

proc glm data = bluefin;

model length = age | age/ solution;

run;

PROC CORR DATA = BLUEFIN;

var age age2;

run;

proc means data = bluefin;

output out=summary mean(age)=meanage mean(age2)=meanage2 std(age)=stdevage std(age2)=stdevage2;

run;

data bluefincomb;

if \_n\_=1 then set summary;

set bluefin;

run;

data bluefincomb;

set bluefincomb;

stdage = (age-meanage)/stdevage;

stdage2 = stdage\*\*2;

centerage = age-meanage;

centerage2=centerage\*\*2;

run;

PROC CORR DATA = bluefincomb;

var stdage stdage2;

run;

PROC CORR DATA = bluefincomb;

var centerage centerage2;

run;

proc reg data = bluefincomb;

model length = stdage stdage2;

run;

proc reg data = bluefincomb;

model length = centerage centerage2;

run;

\*Animal metabolism example;

\*To import data;

FILENAME REFFILE '/home/sadiet0/Metabolism Data Prob 26.csv';

PROC IMPORT DATAFILE=REFFILE

DBMS=CSV

OUT=metabolism;

GETNAMES=YES;

RUN;

proc print data = metabolism;

run;

\*To raise mass to the 3/4 power;

data metabolism;

set metabolism;

powermass = mass\*\*0.75;

run;

\*To log the mass and metab and lifespan;

data metabolism;

set metabolism;

logpowermass=log(powermass);

logmetab=log(metab);

loglife=log(life);

logmass=log(mass);

run;

proc print data = metabolism;

var CommonName Species mass metab life logmass logmetab loglife;

run;

data metabolism;

set metabolism;

nlogmass = logmass - 0.91629;

nlogmetab = logmetab-5.7104;

run;

proc reg data = metabolism;

model loglife = logmass logmetab / covb;

run;

proc reg data = metabolism;

model loglife = nlogmass nlogmetab / covb;

run;

data mycritval;

critv90 = quantile("t", .975, 95-5);

critv92 = quantile("t", .975, 95-3);

run;

proc print data = mycritval;

run;