# SAVEETHA SCHOOL OF ENGINEERING

# SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

# ITA 0443 - STATISTICS WITH R PROGRAMMING FOR REAL TIME PROBLEM

DAY 4– LAB MANUAL

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LINEAR REGRESSION ANALYSIS IN R

Exercise

1. Using linear regression analysis establish a relationship between height and weight of a

person using the input vector given below.

# Values of height

151, 174, 138, 186, 128, 136, 179, 163, 152, 131

# Values of weight.

63, 81, 56, 91, 47, 57, 76, 72, 62, 48

Predict the weight of a person with height 170. Visualize the regression graphically.

SOURCE CODE:

height <- c(151, 174, 138, 186, 128, 136, 179, 163, 152, 131)

weight <- c(63, 81, 56, 91, 47, 57, 76, 72, 62, 48)

data <- data.frame(height, weight)

lm\_model <- lm(weight ~ height, data = data)

new\_height <- data.frame(height = 170)

predicted\_weight <- predict(lm\_model, newdata = new\_height)

library(ggplot2)

ggplot(data, aes(x = height, y = weight)) +

geom\_point() +

geom\_smooth(method = "lm", se = FALSE, color = "red") +

labs(x = "Height", y = "Weight") +

ggtitle("Linear Regression: Height vs. Weight")

2. Download the Dataset &quot;water&quot; From Rdataset Link.Find out whether there is a linear

relation between attributes&quot;mortality&quot; and&quot;hardness&quot; by plot function.Fit the Data into the

Linear Regression model.Predict the mortality for the hardness=88

SOURCE CODE:

install.packages("MASS")

library(MASS)

data(water)

MASS(water, aes(x = hardness, y = mortality)) + geom\_point() + labs(x = "Hardness", y = "Mortality") + MASS("Scatter plot of Mortality vs. Hardness")

lm\_model <- lm(mortality ~ hardness, data = water)

new\_data <- data.frame(hardness = 88)

predicted\_mortality <- predict(lm\_model, newdata = new\_data)

MULTIPLE REGRESSION ANALYSIS IN R

Exercise:

3.Generate a multiple regression model using the built in dataset mtcars.It gives a comparison

between different car models in terms of mileage per gallon (mpg), cylinder

displacement(&quot;disp&quot;), horse power(&quot;hp&quot;), weight of the car(&quot;wt&quot;) and some more parameters.

Establish the relationship between &quot;mpg&quot; as a response variable with &quot;disp&quot;,&quot;hp&quot; and &quot;wt&quot; as

predictor variables. Predict the mileage of the car with dsp=221,hp=102 and wt=2.91.

SOURCE CODE:

data(mtcars)

model <- lm(mpg ~ disp + hp + wt, data = mtcars)

summary(model)

new\_data <- data.frame(disp = 221, hp = 102, wt = 2.91)

predicted\_mpg <- predict(model, newdata = new\_data)

predicted\_mpg

4. Consider the data set &quot;delivery&quot; available in the R environment. It gives a deliverytime

(“delTime”)of production materials(number of productions “n.prod”) with the given

distance(“distance”) to reach the destination place.

a)Create the model to establish the relationship between &quot;delTime&quot; as a response

variable with &quot;n.prod&quot; and &quot;distance&quot; as predictor variables.

b)Predict the delTime for the given number of production(“n.prod”)=9 and

distance(“distance”)=450

SOURCE CODE:

model <- lm(delTime ~ n.prod + distance, data = delivery)

summary(model)

new\_data <- data.frame(n.prod = 9, distance = 450)

predicted\_delTime <- predict(model, newdata = new\_data)

predicted\_delTime