```
library(readr)
data_train <- read_csv("data-train.csv")
```

```
## Rows: 89 Columns: 7
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## dbl (7): St, Re, Fr, R_moment_1, R_moment_2, R_moment_3, R_moment_4
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
data_train <- data_train%>% mutate(TFr = case_when(Fr>1~ .99999, Fr<1~Fr))
data_train <- data_train%>%mutate(TFr=logit(TFr))

data_test_submit <- read_csv("data-test.csv")
```

```
## Rows: 23 Columns: 3
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## dbl (3): St, Re, Fr
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
data_test_submit <- data_test_submit%>% mutate(TFr = case_when(Fr>1~ .99999, Fr<1~Fr))
data_test_submit<-data_test_submit%>%mutate(TFr=logit(TFr))
```

```
model_1<-lm(R_moment_1~I(Re^2)+St+Re+I(Re^2)*St+St:Re,data=data_train)
model_2<-lm(R_moment_2~Re*TFr*St+I(TFr^2):I(Re^2)+I(TFr^2):St +I(TFr^2)+I(Re^2)-Re:TFr:St,data=data_tra
model_3<-lm(R_moment_3~I(TFr^2)*I(Re^2)+St*TFr+Re*TFr+I(TFr^2):St,data=data_train)
model_4<-lm(R_moment_4~I(TFr^2)*I(Re^2)+St*TFr+Re*TFr+I(TFr^2):St,data=data_train)

pred_1 <- predict(model_1, newdata = data_test_submit)
pred_2 <- predict(model_2, newdata = data_test_submit)
pred_3 <- predict(model_3, newdata = data_test_submit)
pred_4 <- predict(model_4, newdata = data_test_submit)

data_test_submit <- mutate(data_test_submit, pred_R_moment_1 = pred_1)
data_test_submit <- mutate(data_test_submit, pred_R_moment_2 = pred_2)
data_test_submit <- mutate(data_test_submit, pred_R_moment_3 = pred_3)
data_test_submit <- mutate(data_test_submit, pred_R_moment_4 = pred_4)

write.csv(data_test_submit,"data_test_submit.csv")
```