

MTH 4230 Lab 6

Due Wed., Apr. 15

1 Part A: Regression with Interactions

1.1 Real Estate Data

A real estate agency provides data on rental properties for clients in a metropolitan area (from **Problem 6.18** in the book). The file **properties.txt** contains the real estate data on **rental rate**, **age**, **operating expense**, **vacancy rate**, and **square footage** for each of $n = 81$ properties.

1. Read the data into R using `read.table()`. Then **remove** the `Op.Expense` column (we won't be using it):

```
my.data$Op.Expense <- NULL
```

2. Use `lm()` to fit the **multiple regression model** to the data, with `Rent.Rate` as the response and the **three** predictors (`Age`, `Vac.Rate`, and `Sq.Ft`) and their **two-** and **three-way interactions** in the model either by listing the interactions explicitly (using the `:` operator):

```
my.reg <- lm(Rent.Rate ~ Age + Vac.Rate + Sq.Ft +  
             Age:Sq.Ft + Age:Vac.Rate + Vac.Rate:Sq.Ft +  
             Age:Vac.Rate:Sq.Ft,  
             data = my.data)
```

or by using the `*` operator:

```
my.reg <- lm(Rent.Rate ~ Age * Vac.Rate * Sq.Ft, data = my.data)
```

Then use `summary()` to look at the results.

3. Because the three-way interaction *wasn't* significant, refit the **multiple regression model** to the data, **dropping** the three-way interaction, for example by typing:

```
my.reg <- lm(Rent.Rate ~ Age + Vac.Rate + Sq.Ft +  
             Age:Sq.Ft + Age:Vac.Rate + Vac.Rate:Sq.Ft,  
             data = my.data)
```

4. Now refit the model from the last step, but **dropping** the **two-way interactions** `Age:Sq.Ft` and `Vac.Rate:Sq.Ft`.