A1 Q1

Victor Su

2025-02-07

```{r} # Q1

e\_com = read.csv(r”(A1-Commerce.csv)“, header = TRUE, stringsAsFactors = FALSE)

# Specify the year

e\_comQuarter, 1,4))

# Specify the indicator variables

e\_comQuarter, 7,8)==“1”,1,0)) e\_comQuarter, 7,8)==“2”,1,0)) e\_comQuarter, 7,8)==“3”,1,0)) e\_comQuarter, 7,8)==“4”,1,0))

# Fit the model

model\_reg = lm(Value ~ Year + Q1 + Q2 + Q3 + Q4 -1, data = e\_com)

summary(model\_reg)

# plot results

e\_comFitted <- predict(model\_reg)

library(ggplot2)

ggplot(ts(residuals(model\_reg))) ggplot(e\_com, aes(x = Time)) + geom\_line(aes(y = Value, color = “Actual”), size = 1) + geom\_line(aes(y = Fitted, color = “Fitted”), size = 1, linetype = “dashed”) + scale\_x\_continuous(breaks = e\_comQuarter) + labs(title = “Actual vs. Fitted Values”, x = “Time (Quarterly)”, y = “Value”) +theme\_minimal() +theme(axis.text.x = element\_text(angle = 45, hjust = 1)) + scale\_color\_manual(values = c(“Actual” = “blue”, “Fitted” = “red”))

# plot residuals

residuals\_df = data.frame(Time = e\_com$Time, Residuals = residuals(model\_reg))

ggplot(residuals\_df, aes(x = Time, y = Residuals)) + geom\_line(color = “blue”) + geom\_hline(yintercept = 0, linetype = “dashed”, color = “red”) + ggtitle(“Residual Plot of Regression Model”) + xlab(“Time”) + ylab(“Residuals”) + theme\_minimal() ```