Lec20_(c)

(c)

```
aba <- read.csv("Abalone.csv")
aba$Sexf <- factor(x=aba$Sex, labels=c("I", "M", "F"))
fit <- glm(Rings ~ Sexf*log(Shell), family = poisson(link = "log"), data = aba)
K.m <- matrix(c(0, 1, 0, 0, log(0.2), 0,
                0, 0, 1, 0, 0, log(0.2),
                0, 1, -1, 0, log(0.2), -1*log(0.2),
                0, 1, 0, 0, log(0.3), 0,
                0, 0, 1, 0, 0, log(0.3),
                0, 1, -1, 0, log(0.3), -1*log(0.3)), nrow = 6, byrow = TRUE)
library(mcprofile)
```

```
## Loading required package: ggplot2
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
mc <- mcprofile(fit, K.m)
exp.mc <- exp(confint(mc))
exp.mc$estimate %>% unlist() -> l
exp.mc$confint %>% unlist() -> ll
Ratios <- data.frame('Ratio of Means' = l, lower = ll[1:6], upper = ll[7:12])
Ratios <- `row.names<-`(Ratios, c("M:I at 0.2", "F:I at 0.2", "M:F at 0.2", "M:I at 0.3", "F:I at 0.3", "M:F at 0.3"))
```

```
# Coefficient matrix
K.m
```

```
##      [,1] [,2] [,3] [,4]      [,5]      [,6]
## [1,]    0    1    0    0 -1.609438  0.000000
## [2,]    0    0    1    0  0.000000 -1.609438
## [3,]    0    1   -1    0 -1.609438  1.609438
## [4,]    0    1    0    0 -1.203973  0.000000
## [5,]    0    0    1    0  0.000000 -1.203973
## [6,]    0    1   -1    0 -1.203973  1.203973
```

```
#Estimates and CIs
Ratios
```

```
##            Ratio.of.Means     lower    upper
## M:I at 0.2      1.0577628 1.0192161 1.097886
## F:I at 0.2      1.0775019 1.0350352 1.121717
## M:F at 0.2      0.9816807 0.9481964 1.016445
## M:I at 0.3      1.0397293 0.9951105 1.086551
## F:I at 0.3      1.0530140 1.0074456 1.100841
## M:F at 0.3      0.9873841 0.9592459 1.016411
```

```r
#Comparison with estiamtes from part (a) leave 2 decimal places
w0.2 <- c(9.51, 10.06, 10.25)
w0.3 <- c(10.74, 11.16, 11.31)
w0.4 <- c(11.70, 12.02, 12.12)
M <- data.frame(Manual = c(w0.2[2]/w0.2[1], w0.2[3]/w0.2[1], w0.2[2]/w0.2[3], w0.3[2]/w0.3[1], w0.3[3]/w0.3
[1], w0.3[2]/w0.3[3]))
cbind(M, Ratios)[1:2]
```

```
##               Manual Ratio.of.Means
## M:I at 0.2 1.0578339      1.0577628
## F:I at 0.2 1.0778128      1.0775019
## M:F at 0.2 0.9814634      0.9816807
## M:I at 0.3 1.0391061      1.0397293
## F:I at 0.3 1.0530726      1.0530140
## M:F at 0.3 0.9867374      0.9873841
```

By comparing mcprofile and manual results, we can see the ratios are close enough to say mcprofile estimates matches manual reports, results imported from part (a) has been rounded before calculation hence small differences can be ignored.