

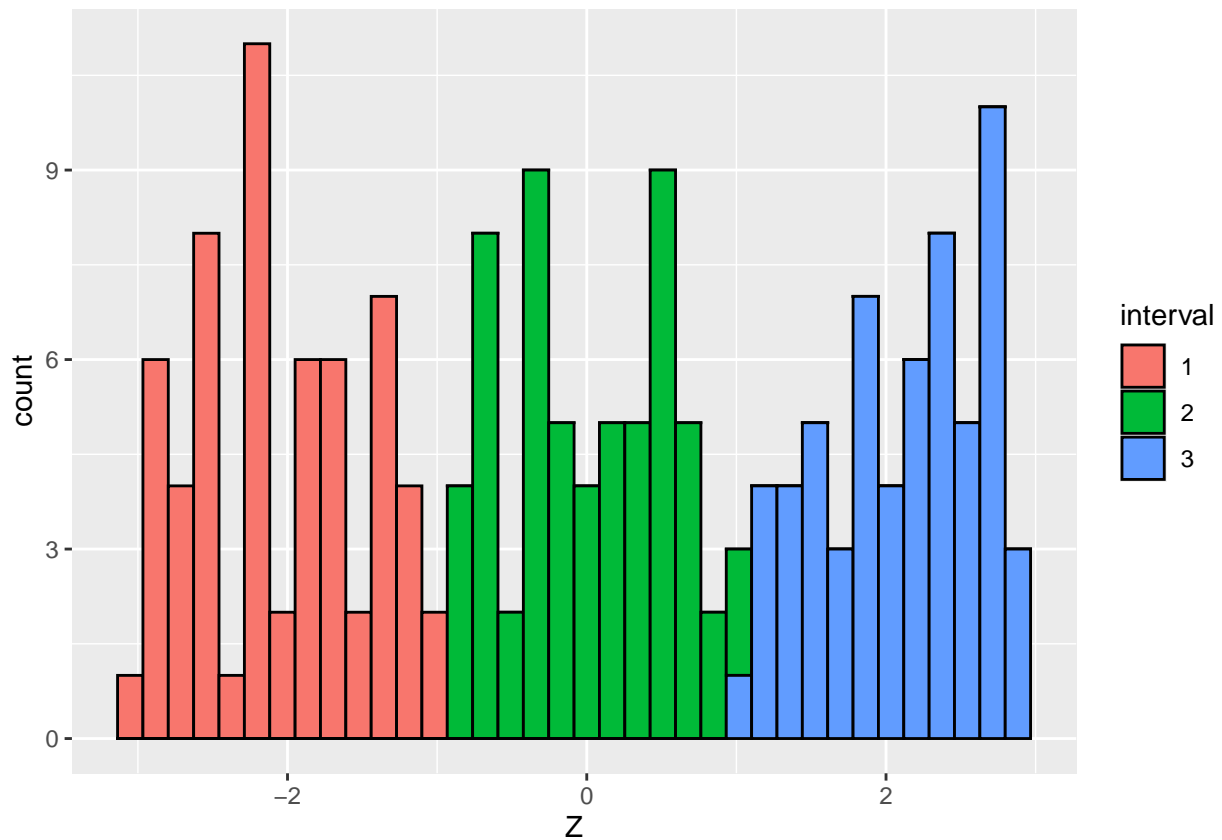
```
library(covdepGE)
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.1.3
```

```
# get the data
set.seed(12)
data <- generateData()
X <- data$X
Z <- data$Z
interval <- data$interval
prec <- data$true_precision

# get overall and within interval sample sizes
n <- nrow(X)
n1 <- sum(interval == 1)
n2 <- sum(interval == 2)
n3 <- sum(interval == 3)

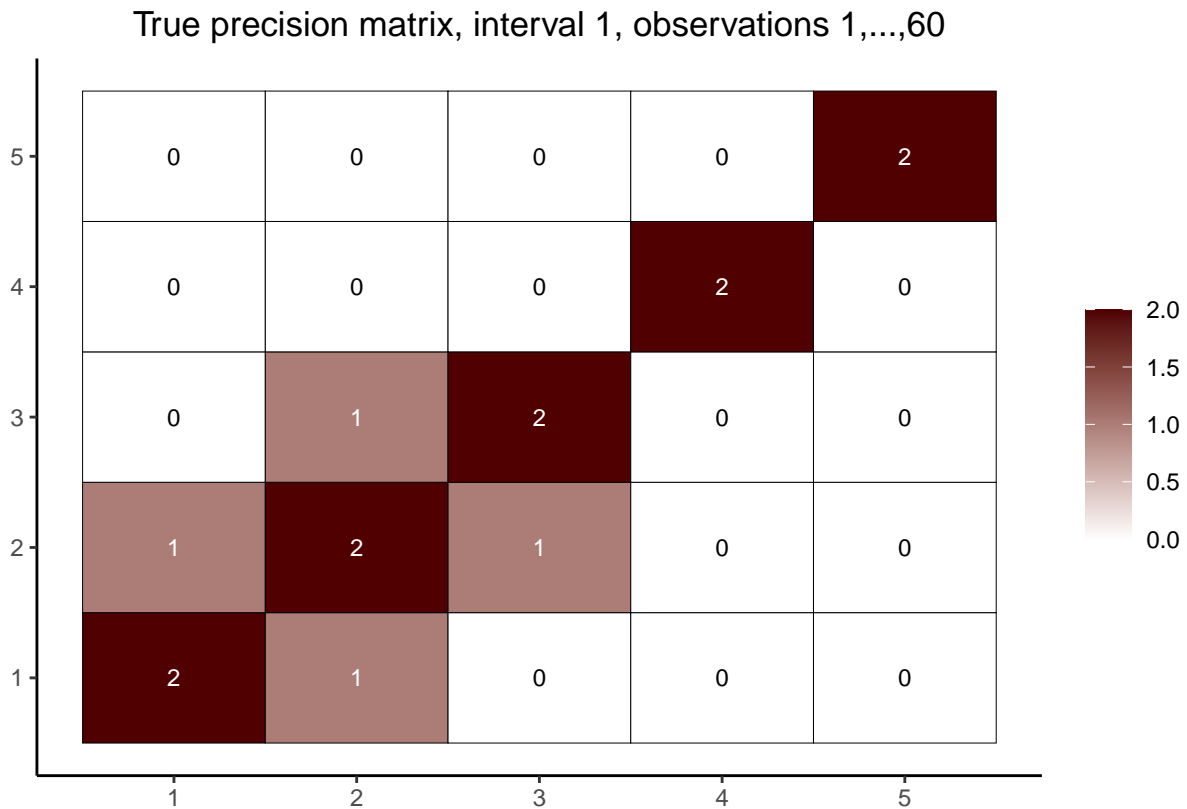
# visualize the distribution of the extraneous covariate
ggplot(data.frame(Z = Z, interval = as.factor(interval))) +
  geom_histogram(aes(Z, fill = interval), color = "black", bins = n %/% 5)
```



```
# visualize the true precision matrices in each of the intervals
```

```
# interval 1
```

```
matViz(prec[[1]], incl_val = TRUE) +  
  ggtitle(paste0("True precision matrix, interval 1, observations 1,...,", n1))
```



```
# interval 2 (varies continuously with Z)
```

```
cat("\nInterval 2, observations ", n1 + 1, ",...,", n1 + n2, sep = "")
```

```
##
```

```
## Interval 2, observations 61,...,120
```

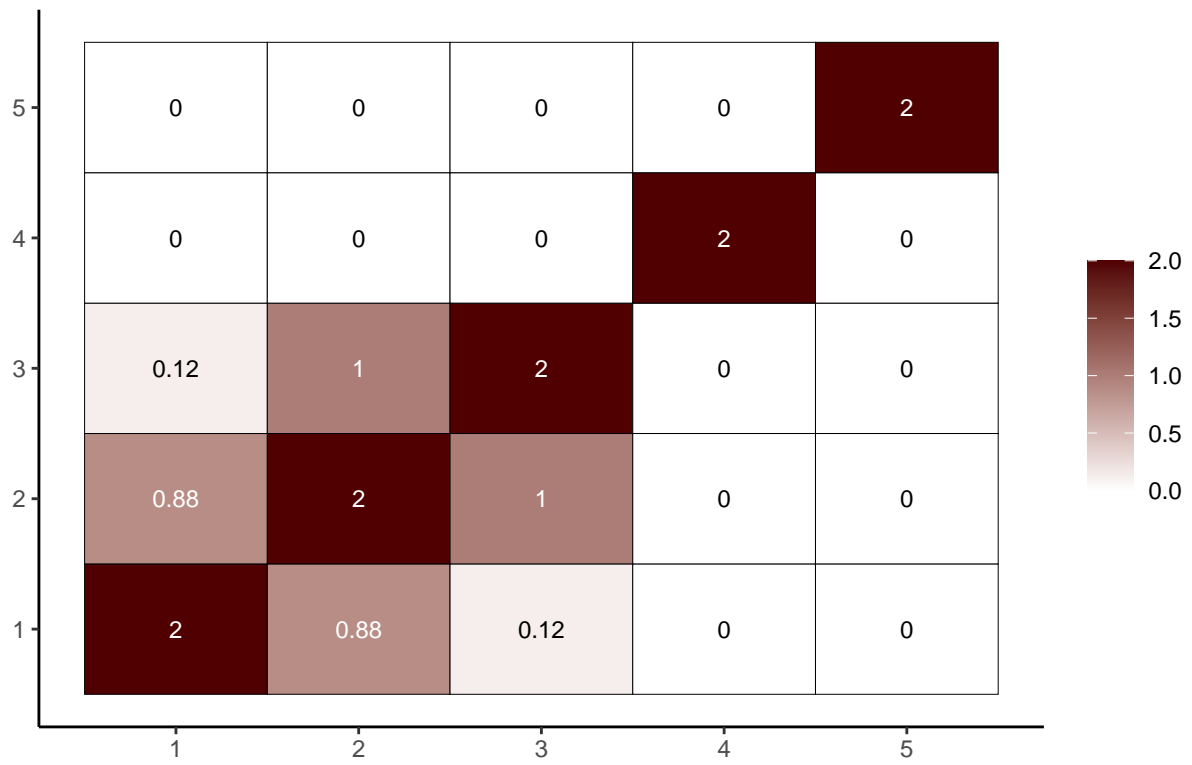
```
int2_mats <- prec[interval == 2]
```

```
int2_inds <- c(5, n2 %% 2, n2 - 5)
```

```
lapply(int2_inds, function(j) matViz(int2_mats[[j]], incl_val = TRUE) +  
  ggtitle(paste("True precision matrix, interval 2, observation", j + n1)))
```

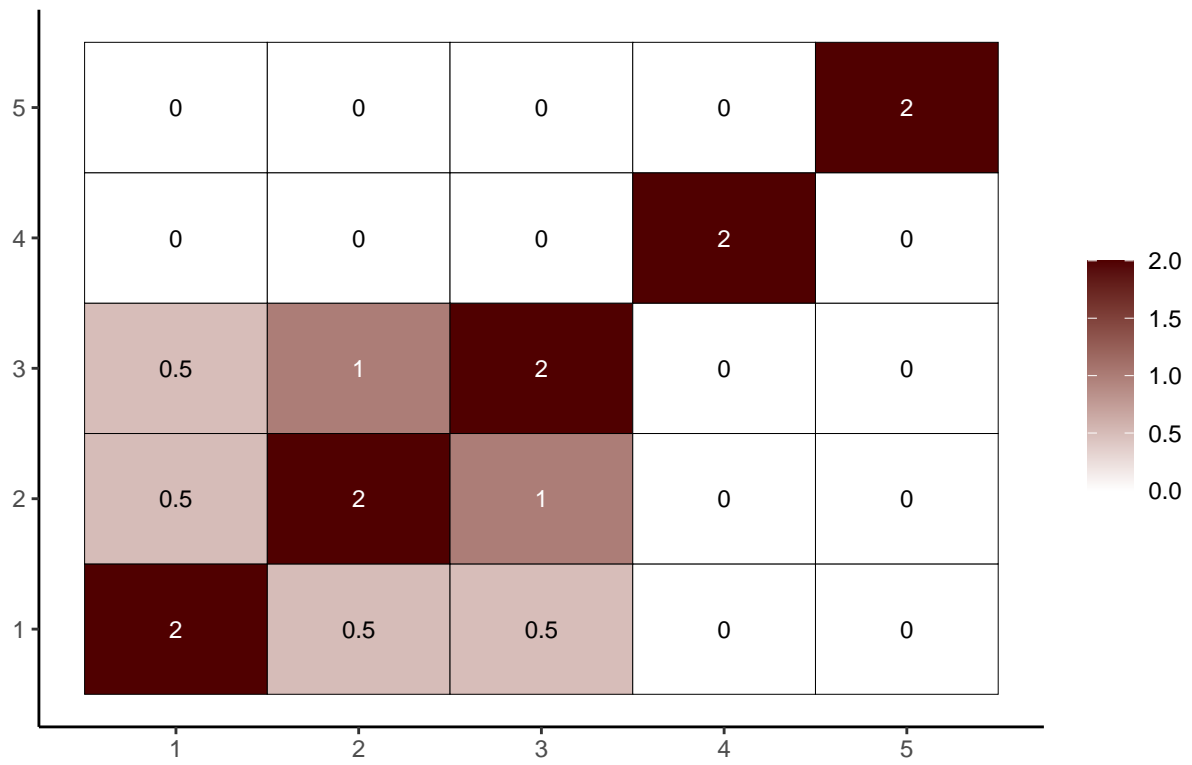
```
## [[1]]
```

True precision matrix, interval 2, observation 65



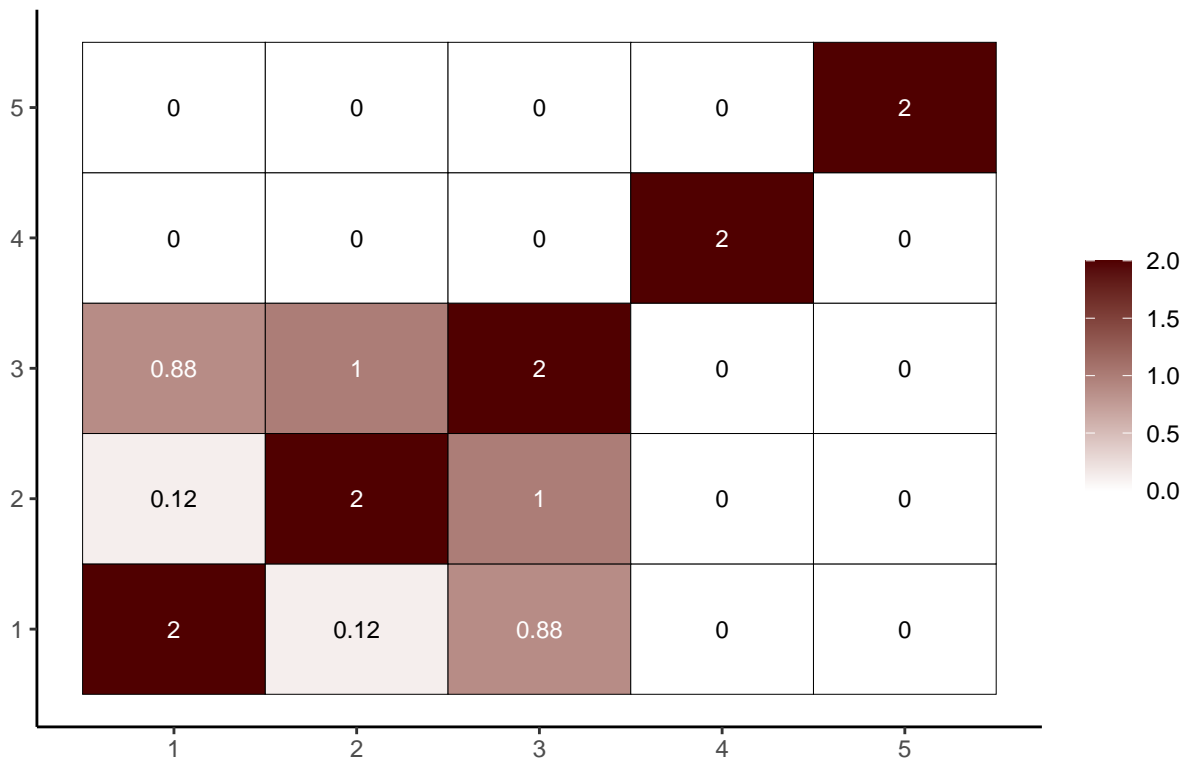
```
##
## [[2]]
```

True precision matrix, interval 2, observation 90

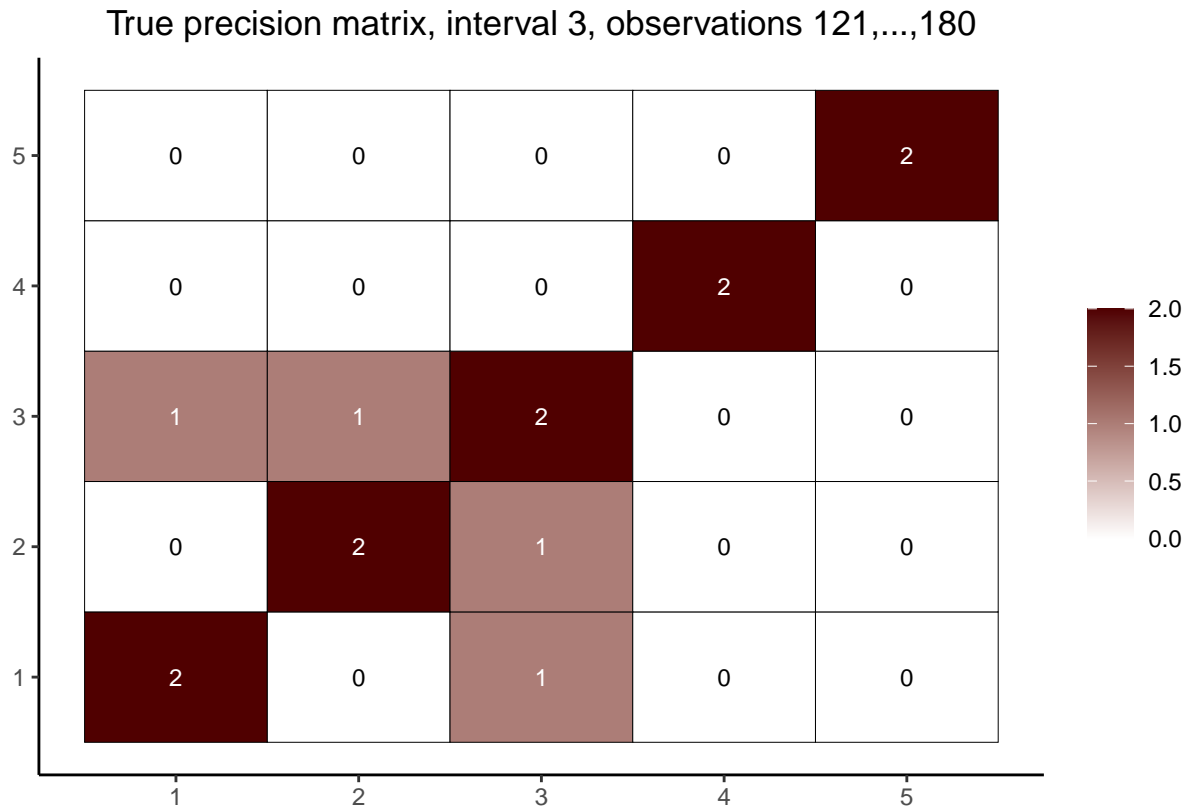


```
##  
## [[3]]
```

True precision matrix, interval 2, observation 115



```
# interval 3
matViz(prec[[length(prec)]], incl_val = TRUE) +
  ggtitle(paste0("True precision matrix, interval 3, observations ",
    n1 + n2 + 1, ",...", n1 + n2 + n3))
```



```
# fit the model and visualize the estimated graphs
(out <- covdepGE(X, Z))
```

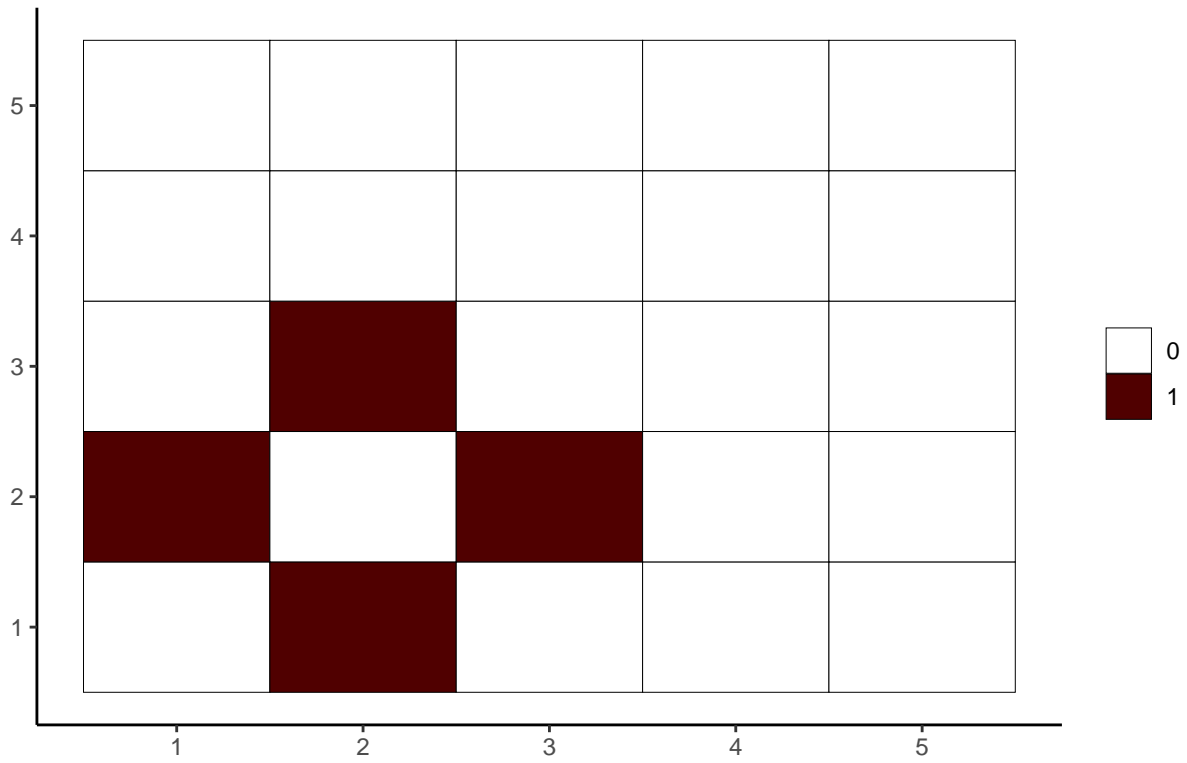
```
## |
```

```
## Covariate Dependent Graphical Model
##
## ELB0: -171501.68 # Unique Graphs: 3
## n: 180, variables: 5 Hyperparameter grid size: 125 points
## Model fit completed in 6.05 secs
```

```
plot(out)
```

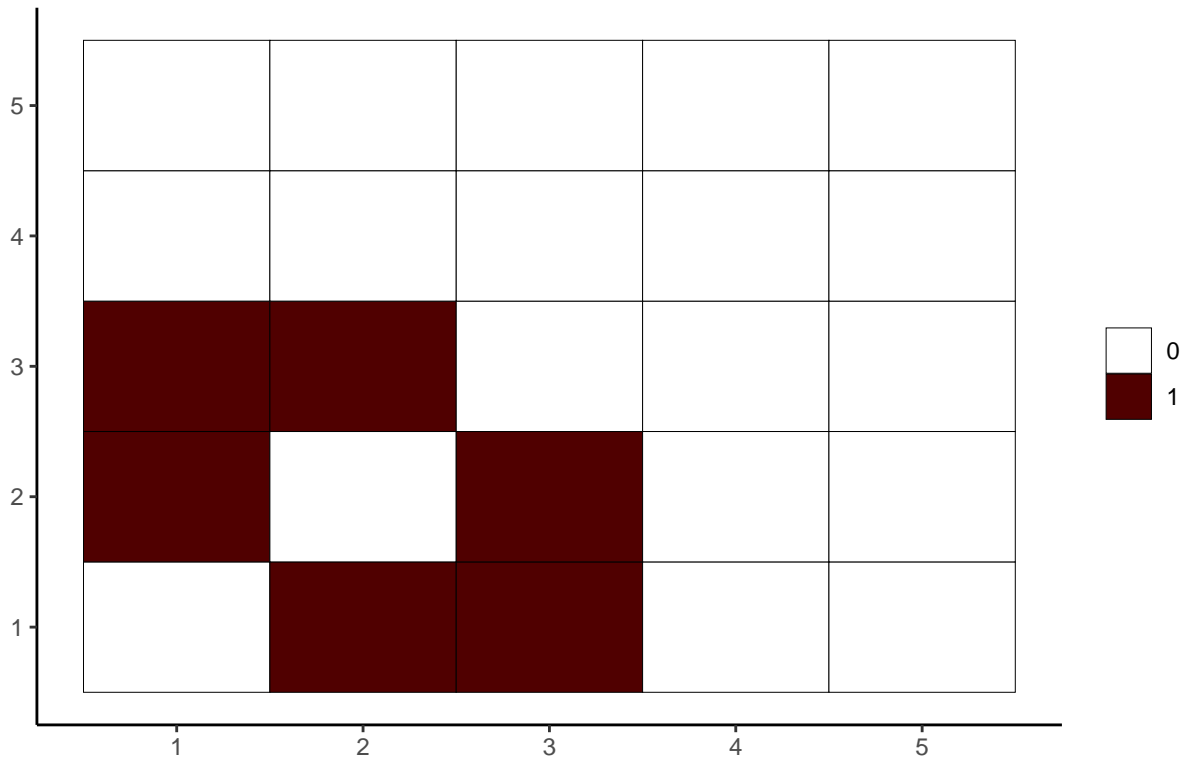
```
## [[1]]
```

Graph 1, observations 1,...,39



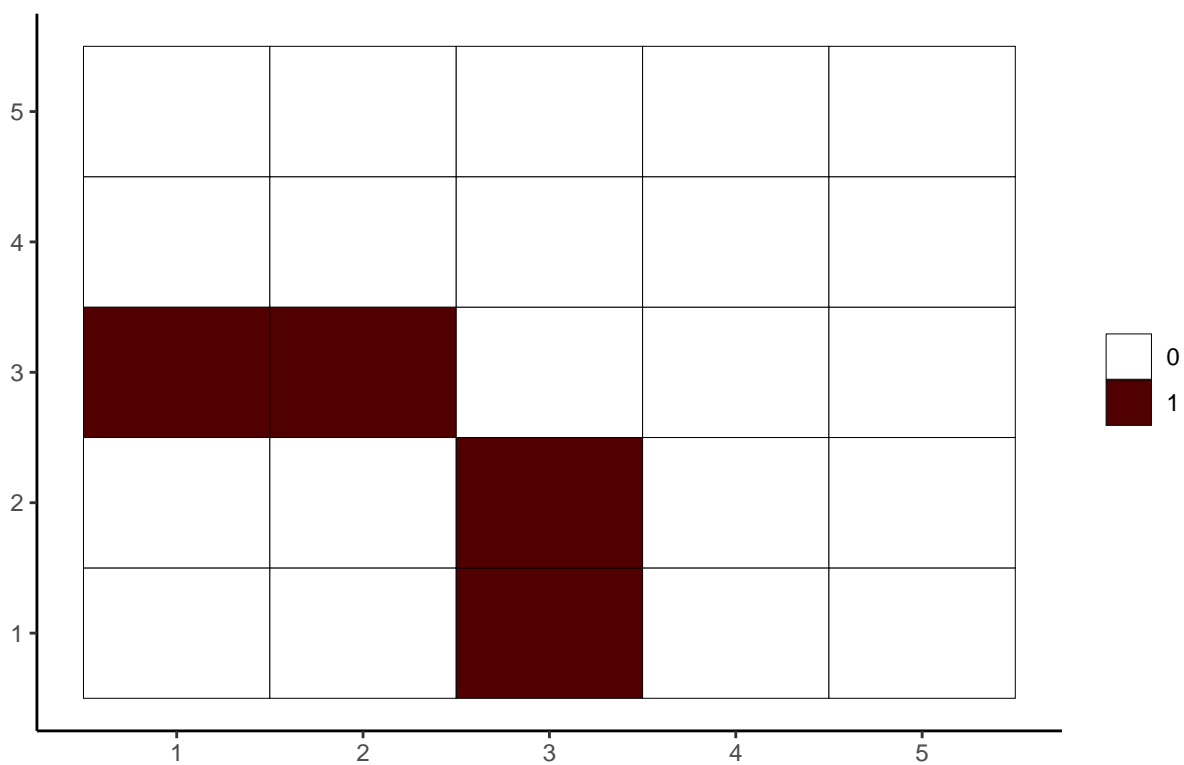
```
##  
## [[2]]
```

Graph 2, observations 40,...,110

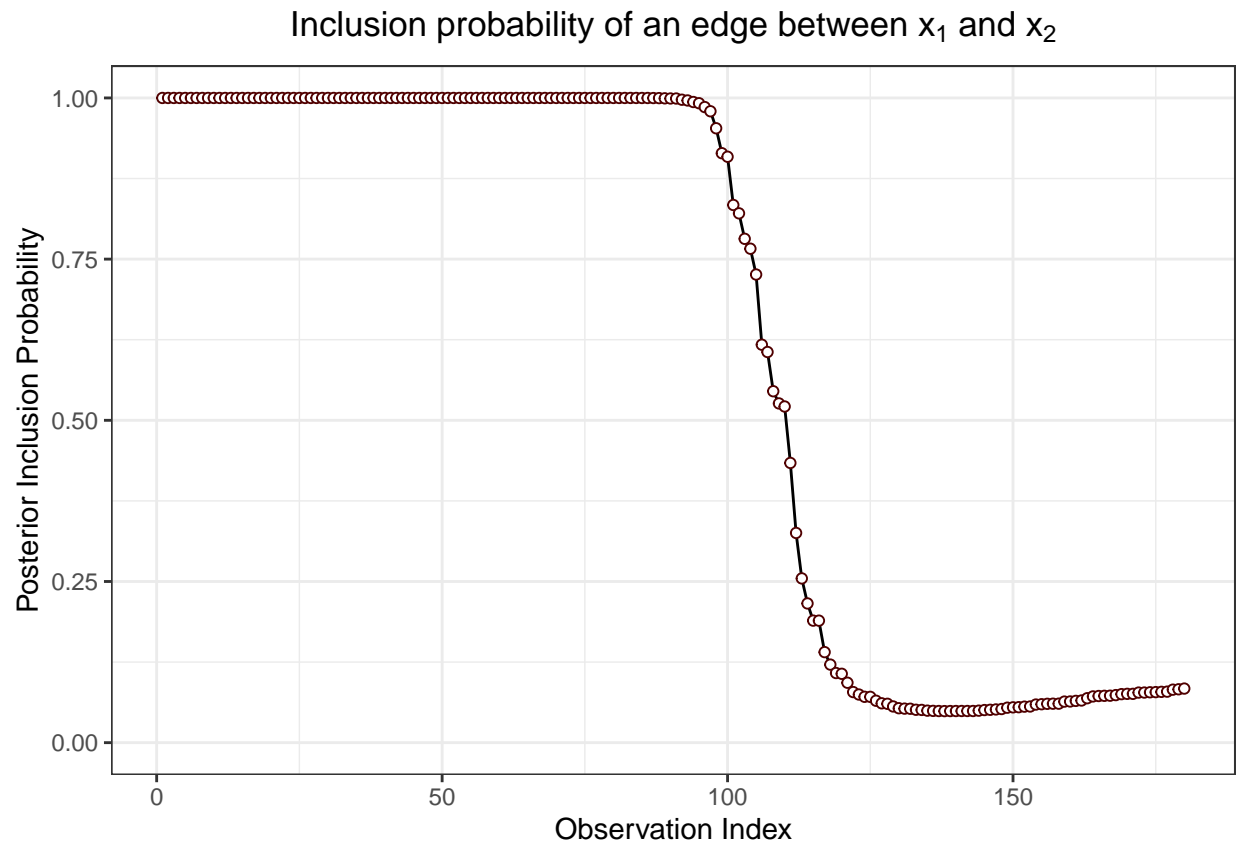


```
##  
## [[3]]
```


Graph 3, observations 111,...,180



```
# visualize the posterior inclusion probabilities for variables (1, 3) and (1, 2)  
inclusionCurve(out, 1, 2)
```



```
inclusionCurve(out, 1, 3)
```

