

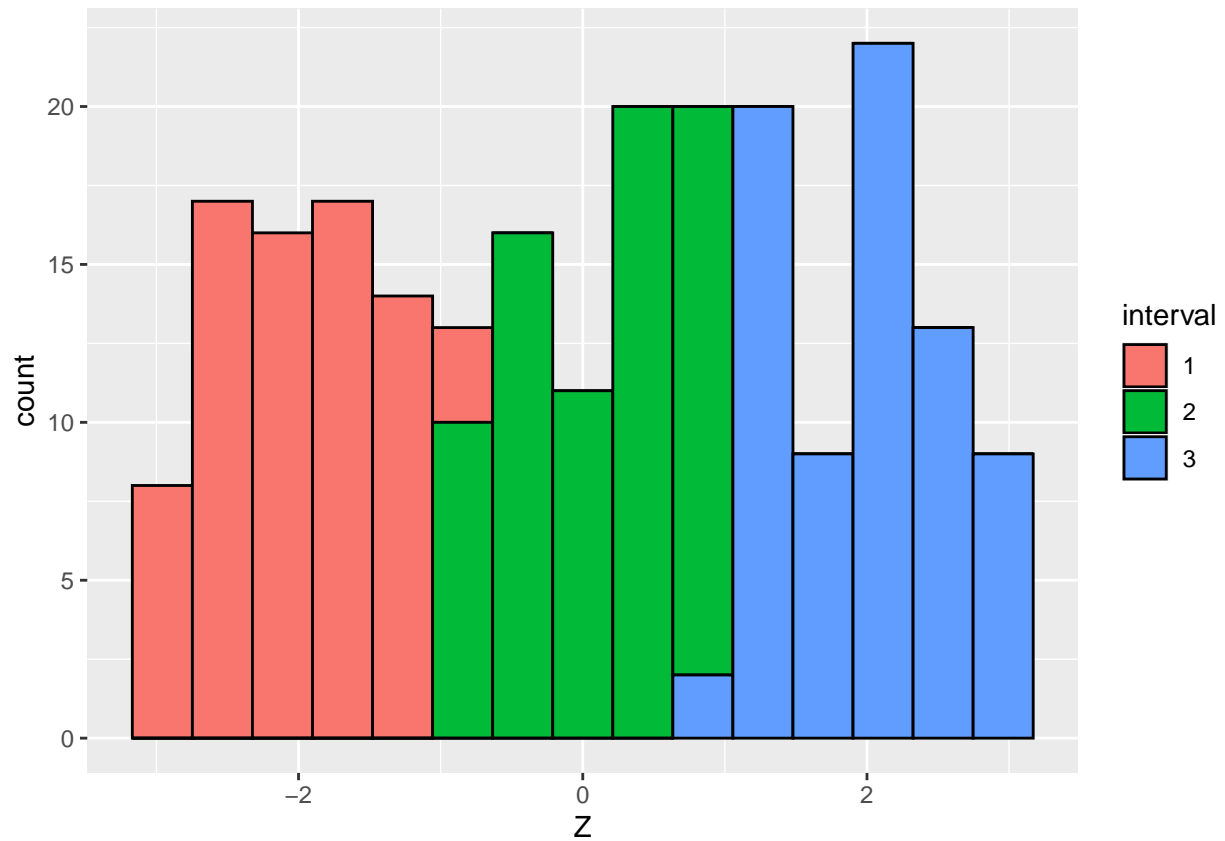
## covdepGE example

```
library(covdepGE)
library(ggplot2)

# get the data
set.seed(2023)
data <- generateData(p = 5, n1 = 75, n2 = 75, n3 = 75)
X <- data$X
Z <- data$Z
interval <- data$interval
Omega <- data$true_precision

# get overall and within interval sample sizes
p <- ncol(X)
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 %/% 15)
```

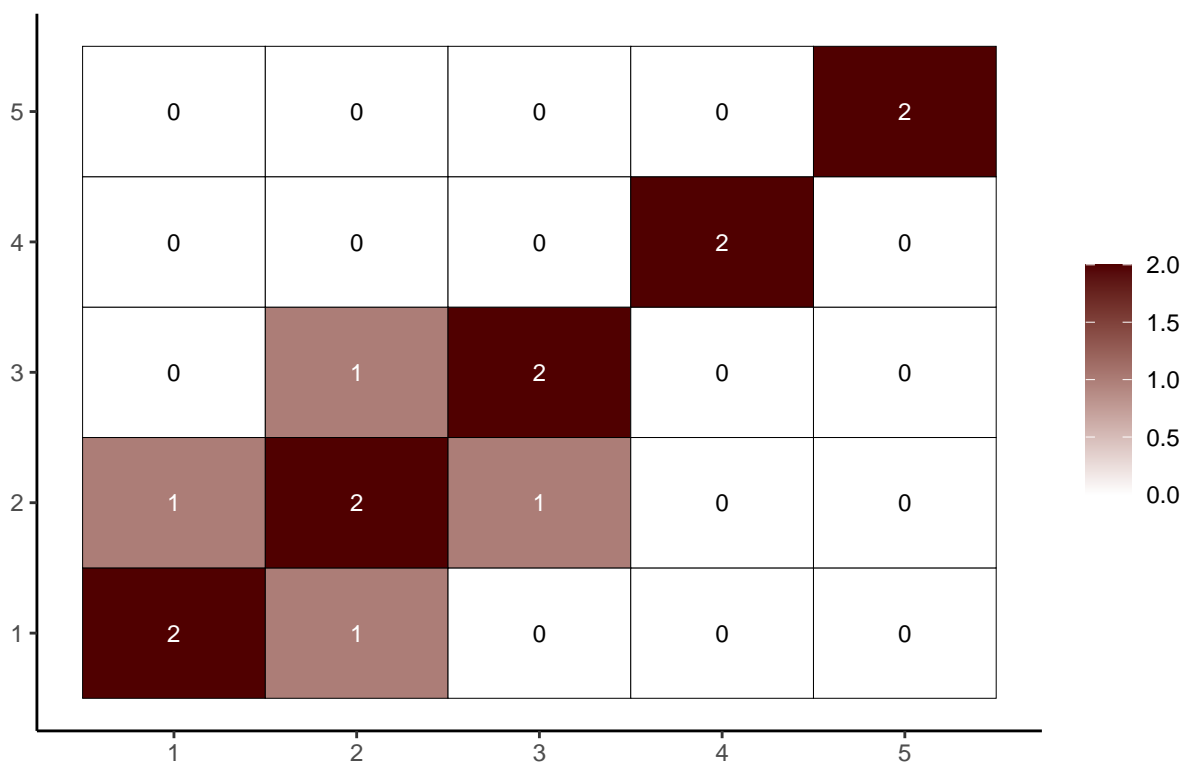


```
# visualize the true precision matrices in each of the intervals
```

```
# interval 1
```

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

True precision matrix, interval 1, observations 1,...,75



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

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

```
##
```

```
## Interval 2, observations 76,...,150
```

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

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

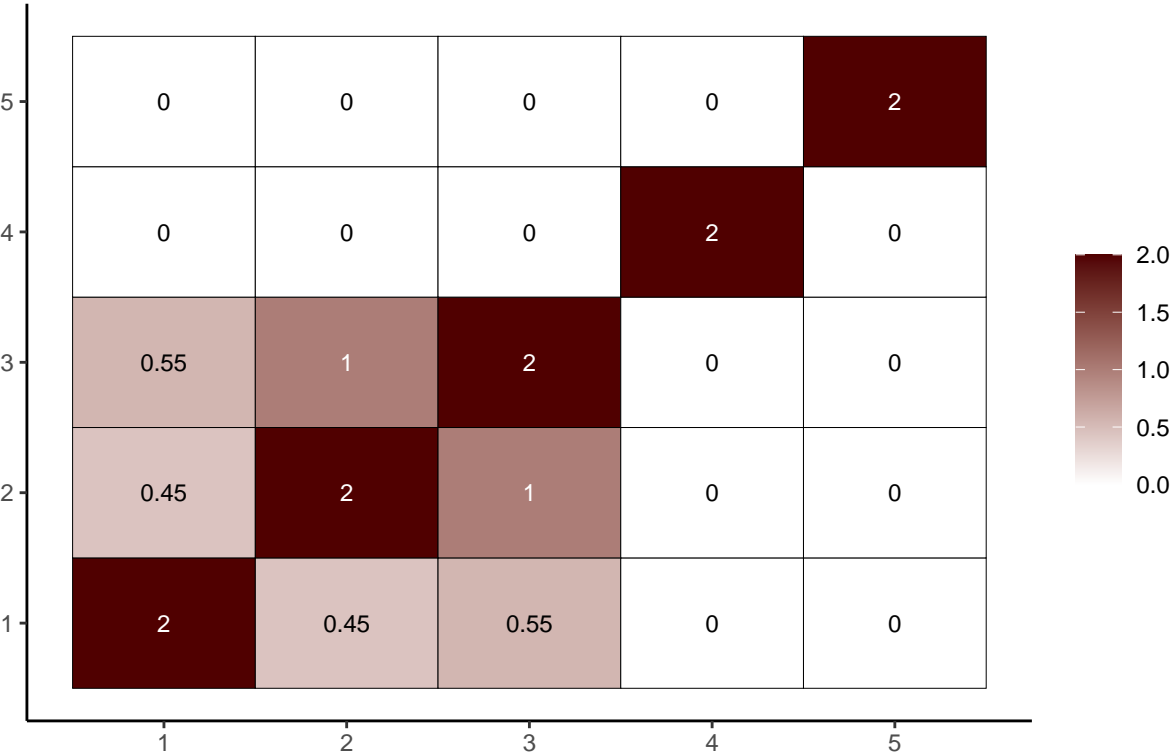
```
lapply(int2_inds, function(j) matViz(int2_mats[[j]], incl_val = TRUE) +  
  ggtitle(paste("True precision matrix, interval 2, observation", j + n1)))
```

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

	1	2	3	4	5
1	2	0.9	0.1	0	0
2	0.9	2	1	0	0
3	0.1	1	2	0	0
4	0	0	0	2	0
5	0	0	0	0	2

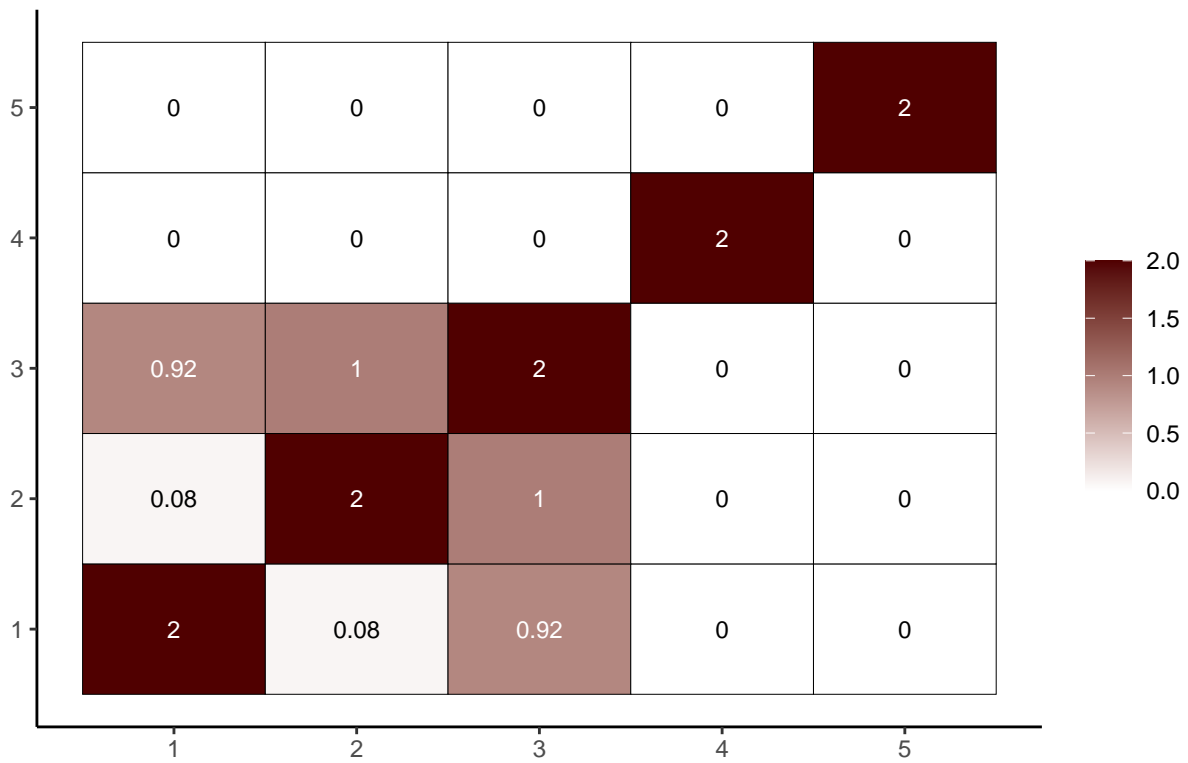
4

True precision matrix, interval 2, observation 112



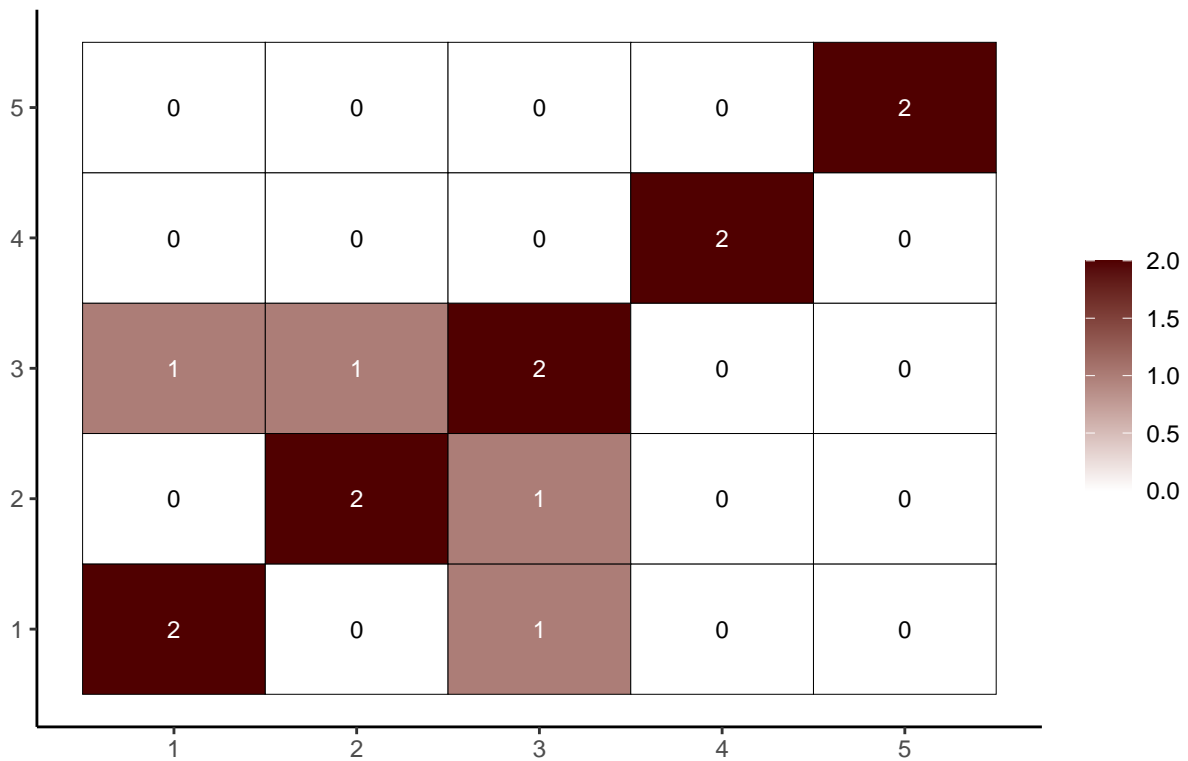
```
##  
## [[3]]
```

True precision matrix, interval 2, observation 145



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

True precision matrix, interval 3, observations 151,...,225



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

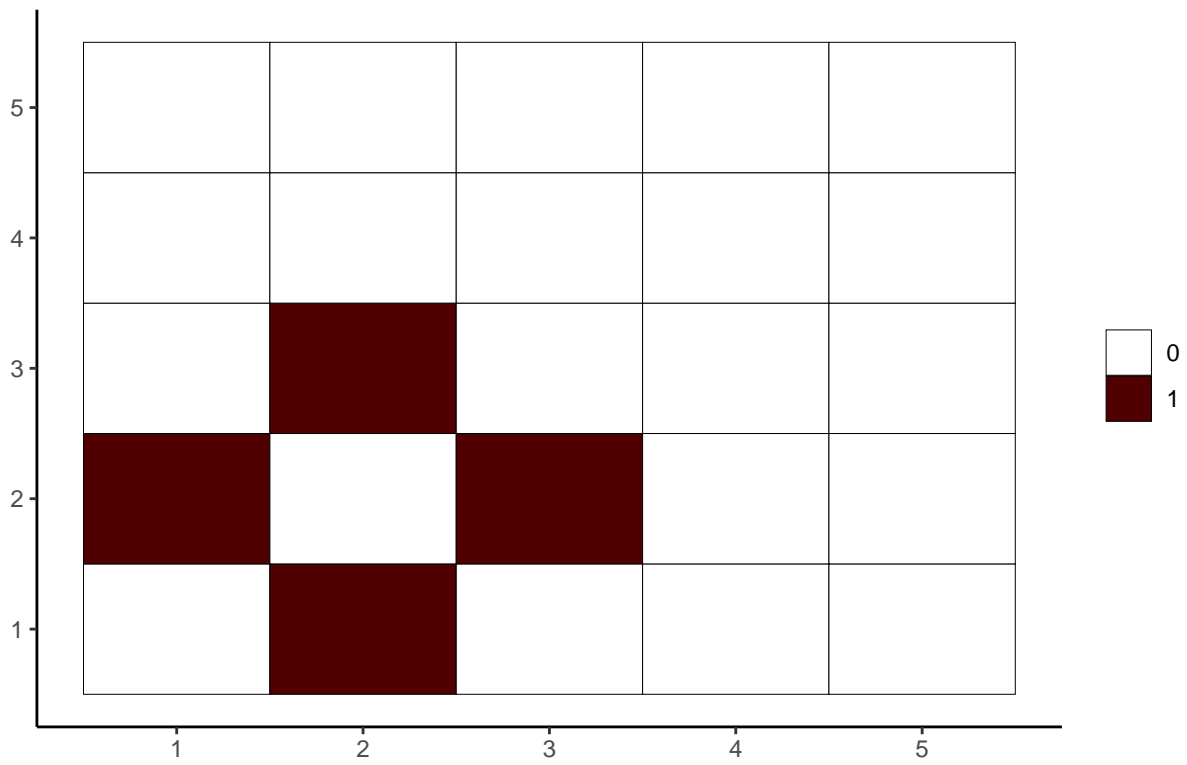
```
## |
```

```
## Covariate Dependent Graphical Model
##
## ELB0: -271148.87 # Unique Graphs: 3
## n: 225, variables: 5 Hyperparameter grid size: 125 points
## Model fit completed in 11.809 secs
```

```
plot(out)
```

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

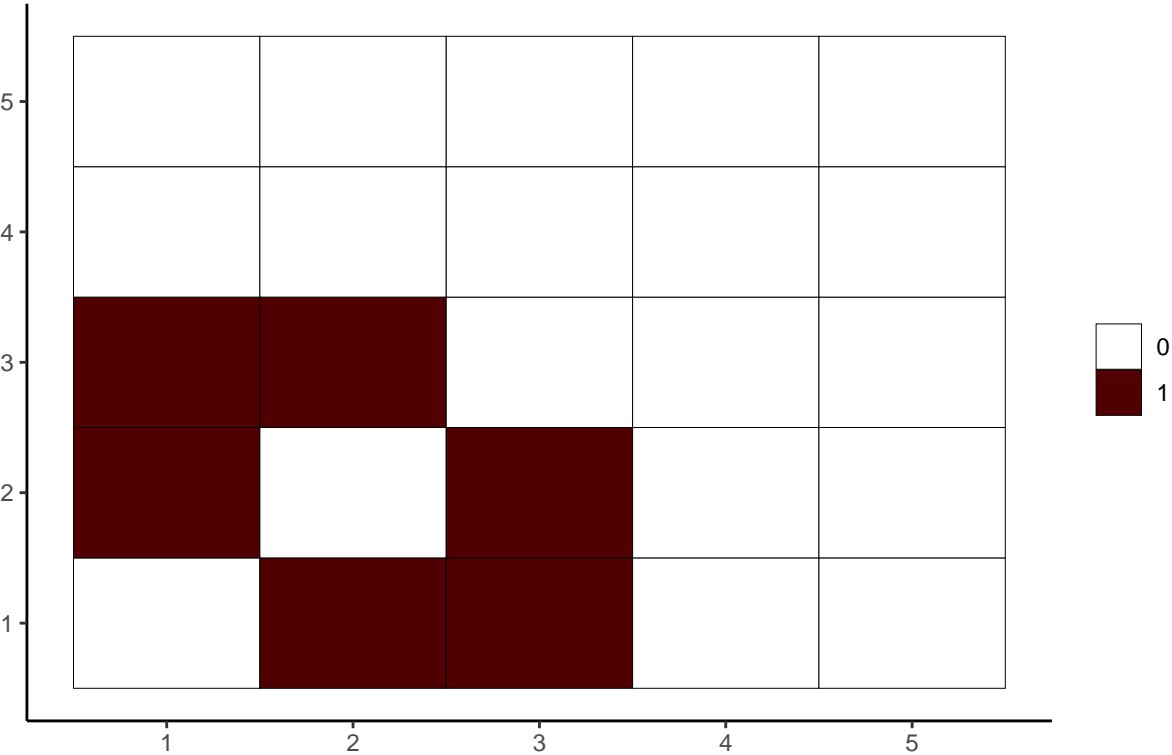
Graph 1, observations 1,...,72



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

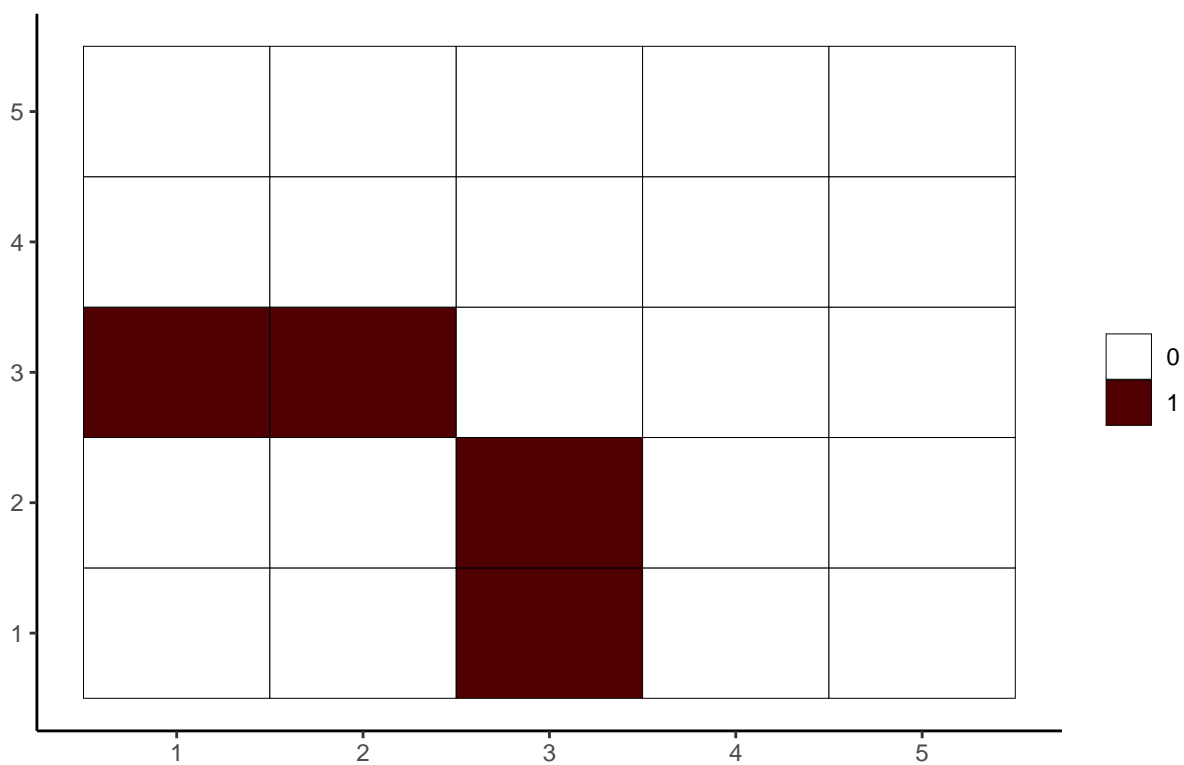


Graph 2, observations 73,...,146

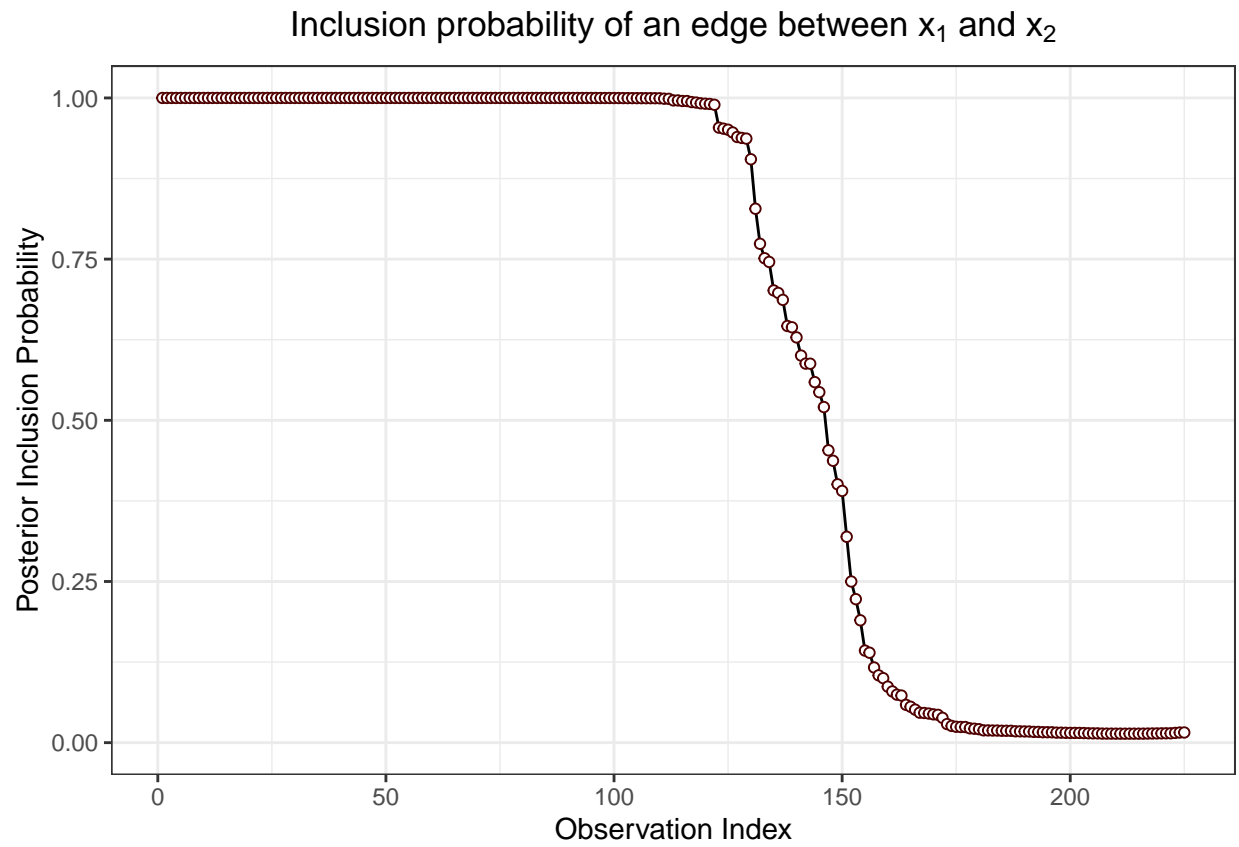


```
##  
## [[3]]
```

Graph 3, observations 147,...,225



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



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

