Ising model knockoffs tutorial

Stephen Bates

```
library(knockoff)
library(bayess)
```

```
## Loading required package: MASS
```

```
## Loading required package: mnormt
```

```
## Loading required package: gplots
```

```
##
## Attaching package: 'gplots'
```

```
## The following object is masked from 'package:stats':
##
##     lowess
```

```
## Loading required package: combinat
```

```
##
## Attaching package: 'combinat'
```

```
## The following object is masked from 'package:utils':
##
##     combn
```

```
source("../Ising/Ising.r")
```

```
n = 100
d = 5 #5x5 grid
beta_0 = .5
```

We create 100 5x5 Ising models using the bayess package.

```
set.seed(100)
X = t(replicate(n, as.vector(isinghm(niter = 100, n = d, m = d, beta = 2*beta_0))))
dim(X)
```

```
## [1] 100  25
```

```
set.seed(100)
Xk = c()
for(i in 1:n) {
  x = matrix(X[i, ], nrow = d, ncol = d)
  xk = ising_knockoff(x, d, d, beta_0)
  Xk = rbind(Xk, as.vector(xk))
}
```

```
cors = c()
for(j in 1:(d*d)) {
  cors = c(cors, cor(X[, j], Xk[, j]))
}
mean(cors)
```

```
## [1] 0.5984209
```