

# Using the robsel package

This vignette illustrates the basic usage of the `robsel` package to estimate of the regularization parameter for Graphical Lasso.

## Data

We use a 100-by-5 matrix generated from normal distribution.

```
X <- matrix(rnorm(100*5),ncol=5)
```

## Using robsel functions

### Estimate of the regularization parameter for Graphical Lasso

The function `robsel` estimates  $\lambda$ , a regularization parameter for Graphical Lasso at a prespecified confidence level  $\alpha$ .

```
library(robsel)
lambda <- robsel(X)
lambda
#> [1] 0.3828479
```

### Graphical Lasso algorithm with $\lambda$ from Robust Selection

The function `robsel.glasso` returns estimates a sparse inverse covariance matrix using Graphical Lasso with regularization parameter estimated from Robust Selection

```
A <- robsel.glasso(X)
A
#> $w
#>      [,1]      [,2]      [,3]      [,4]      [,5]
#> [1,] 1.426083 0.000000 0.000000 0.000000 0.000000
#> [2,] 0.000000 1.441829 0.000000 0.000000 0.000000
#> [3,] 0.000000 0.000000 1.246116 0.000000 0.000000
#> [4,] 0.000000 0.000000 0.000000 1.670489 0.000000
#> [5,] 0.000000 0.000000 0.000000 0.000000 1.474429
#>
#> $wi
#>      [,1]      [,2]      [,3]      [,4]      [,5]
#> [1,] 0.7012216 0.0000000 0.0000000 0.0000000 0.0000000
#> [2,] 0.0000000 0.6935635 0.0000000 0.0000000 0.0000000
#> [3,] 0.0000000 0.0000000 0.8024936 0.0000000 0.0000000
#> [4,] 0.0000000 0.0000000 0.0000000 0.598627 0.0000000
#> [5,] 0.0000000 0.0000000 0.0000000 0.000000 0.6782286
#>
#> $loglik
#> [1] NA
#>
#> $errflag
#> [1] 0
#>
#> $approx
#> [1] FALSE
```

```
#>  
#> $del  
#> [1] 0  
#>  
#> $niter  
#> [1] 0
```