

# Package ‘mixedLSR’

May 8, 2026

**Title** Mixed, Low-Rank, and Sparse Multivariate Regression on High-Dimensional Data

**Version** 0.1.0

**Description** Mixed, low-rank, and sparse multivariate regression ('mixedLSR') provides tools for performing mixture regression when the coefficient matrix is low-rank and sparse. 'mixedLSR' allows subgroup identification by alternating optimization with simulated annealing to encourage global optimum convergence. This method is data-adaptive, automatically performing parameter selection to identify low-rank substructures in the coefficient matrix.

**License** MIT + file LICENSE

**Encoding** UTF-8

**RoxygenNote** 7.2.1

**Depends** R (>= 4.1.0)

**Imports** grpreg, purrr, MASS, stats, ggplot2

**Suggests** knitr, rmarkdown, mclust

**VignetteBuilder** knitr

**BugReports** <https://github.com/alexanderjwhite/mixedLSR>

**URL** <https://alexanderjwhite.github.io/mixedLSR/>

**NeedsCompilation** no

**Author** Alexander White [aut, cre] (ORCID: <https://orcid.org/0000-0002-9117-1475>),  
Sha Cao [aut] (ORCID: <https://orcid.org/0000-0002-8645-848X>),  
Yi Zhao [ctb] (ORCID: <https://orcid.org/0000-0003-4766-5934>),  
Chi Zhang [ctb] (ORCID: <https://orcid.org/0000-0001-9553-0925>)

**Maintainer** Alexander White <[whitealj@iu.edu](mailto:whitealj@iu.edu)>

**Repository** CRAN

**Date/Publication** 2022-11-04 20:00:02 UTC

## Contents

bic_lsr . . . . .	2
mixed_lsr . . . . .	3
plot_lsr . . . . .	4
simulate_lsr . . . . .	5
<b>Index</b>	<b>6</b>

---

bic_lsr	<i>Compute Bayesian information criterion for a mixedLSR model</i>
---------	--

---

### Description

Compute Bayesian information criterion for a mixedLSR model

### Usage

```
bic_lsr(a, n, llik)
```

### Arguments

a	A list of coefficient matrices.
n	The sample size.
llik	The log-likelihood of the model.

### Value

The BIC.

### Examples

```
n <- 50
simulate <- simulate_lsr(n)
model <- mixed_lsr(simulate$x, simulate$y, k = 2, init_lambda = c(1,1), alt_iter = 0)
bic_lsr(model$a, n = n, model$llik)
```

---

mixed_lsr	<i>Mixed Low-Rank and Sparse Multivariate Regression for High-Dimensional Data</i>
-----------	--

---

## Description

Mixed Low-Rank and Sparse Multivariate Regression for High-Dimensional Data

## Usage

```
mixed_lsr(  
  x,  
  y,  
  k,  
  nstart = 1,  
  init_assign = NULL,  
  init_lambda = NULL,  
  alt_iter = 5,  
  anneal_iter = 1000,  
  em_iter = 1000,  
  temp = 1000,  
  mu = 0.95,  
  eps = 1e-06,  
  accept_prob = 0.95,  
  sim_N = 200,  
  verbose = TRUE  
)
```

## Arguments

x	A matrix of predictors.
y	A matrix of responses.
k	The number of groups.
nstart	The number of random initializations, the result with the maximum likelihood is returned.
init_assign	A vector of initial assignments, NULL by default.
init_lambda	A vector with the values to initialize the penalization parameter for each group, e.g., c(1,1,1). Set to NULL by default.
alt_iter	The maximum number of times to alternate between the classification expectation maximization algorithm and the simulated annealing algorithm.
anneal_iter	The maximum number of simulated annealing iterations.
em_iter	The maximum number of EM iterations.
temp	The initial simulated annealing temperature, temp > 0.

mu	The simulated annealing decrease temperature fraction. Once the best configuration cannot be improved, reduce the temperature to $(\mu)T$ , $0 < \mu < 1$ .
eps	The final simulated annealing temperature, $\text{eps} > 0$ .
accept_prob	The simulated annealing probability of accepting a new assignment $0 < \text{accept\_prob} < 1$ . When closer to 1, trial assignments will only be small perturbation of the current assignment. When closer to 0, trial assignments are closer to random.
sim_N	The simulated annealing number of iterations for reaching equilibrium.
verbose	A boolean indicating whether to print to screen.

**Value**

A list containing the likelihood, the partition, the coefficient matrices, and the BIC.

**Examples**

```
simulate <- simulate_lsr(50)
mixed_lsr(simulate$x, simulate$y, k = 2, init_lambda = c(1,1), alt_iter = 0)
```

---

plot\_lsr

*Heatmap Plot of the mixedLSR Coefficient Matrices*


---

**Description**

Heatmap Plot of the mixedLSR Coefficient Matrices

**Usage**

```
plot_lsr(a, abs = TRUE)
```

**Arguments**

a	A coefficient matrix from mixed_lsr model.
abs	A boolean for taking the absolute value of the coefficient matrix.

**Value**

A ggplot2 heatmap of the coefficient matrix, separated by subgroup.

**Examples**

```
simulate <- simulate_lsr()
plot_lsr(simulate$a)
```

---

`simulate_lsr`*Simulate Heterogeneous, Low-Rank, and Sparse Data*

---

**Description**

Simulate Heterogeneous, Low-Rank, and Sparse Data

**Usage**

```
simulate_lsr(  
  N = 100,  
  k = 2,  
  p = 30,  
  m = 35,  
  b = 1,  
  d = 20,  
  h = 0.2,  
  case = "independent"  
)
```

**Arguments**

<code>N</code>	The sample size, default = 100.
<code>k</code>	The number of groups, default = 2.
<code>p</code>	The number of predictor features, default = 30.
<code>m</code>	The number of response features, default = 35.
<code>b</code>	The signal-to-noise ratio, default = 1.
<code>d</code>	The singular value, default = 20.
<code>h</code>	The lower bound for the singular matrix simulation, default = 0.2.
<code>case</code>	The covariance case, "independent" or "dependent", default = "independent".

**Value**

A list of simulation values, including x matrix, y matrix, coefficients and true clustering assignments.

**Examples**

```
simulate_lsr()
```

# Index

`bic_ksr`, 2

`mixed_ksr`, 3

`plot_ksr`, 4

`simulate_ksr`, 5