

# Package: MMVBVS (via r-universe)

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**Type** Package

**Title** Missing Multivariate Bayesian Variable Selection

**Version** 0.8.0

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**Description** A variable selection tool for multivariate normal variables with missing-at-random values using Bayesian Hierarchical Model. Visualization functions show the posterior distribution of gamma (inclusion variables) and beta (coefficients). Users can also visualize the heatmap of the posterior mean of covariance matrix. Kim, T. Nicolae, D. (2019)<<https://github.com/tk382/MMVBVS/blob/master/workingpaper.pdf>>. Guan, Y. Stephens, M. (2011)<[doi:10.1214/11-AOAS455](https://doi.org/10.1214/11-AOAS455)>.

**License** GPL (>=2)

**Encoding** UTF-8

**LazyData** true

**LinkingTo** Rcpp, RcppArmadillo

**Imports** Rcpp, reshape, reshape2, ggplot2, rlang

**RoxygenNote** 6.1.1

**Suggests** testthat, MASS

**Repository** <https://tk382.r-universe.dev>

**RemoteUrl** <https://github.com/tk382/mmvbvs>

**RemoteRef** HEAD

**RemoteSha** ec2c5706c204f9d9a715a3e13bc320f734c8f159

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beta_dist	<i>Plot the posterior distribution of the coefficients</i>
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**Description**

Plot the posterior distribution of the coefficients

**Usage**

```
beta_dist(result, title = "")
```

**Arguments**

result	resulting object from mmvbvs function
title	A string object for the title of the resulting plot

**Value**

ggplot object

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mmvbvs	<i>Main function for variable selection</i>
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**Description**

Main function for variable selection

**Usage**

```
mmvbvs(X, Y, initial_chain, Phi, marcor, niter = 1000L, bgiter = 500L,
  hiter = 50L, burnin = 100000L, Vbeta = 1L, smallchange = 1e-04,
  verbose = TRUE)
```

**Arguments**

X	covariate with length N, sample size
Y	multivariate normal response variable N by P
initial_chain	list of starting points for beta, gamma, sigma, and sigmabeta. beta is length P for the coefficients, gamma is length P inclusion vector where each element is 0 or 1. sigma should be P x P covariance matrix, and sigmabeta should be the expected variance of the betas.
Phi	prior for the covariance matrix. We suggest identity matrix if there is no appropriate prior information

marcor	length P vector of correlation between X and each variable of Y
niter	total number of iteration for MCMC
bgiter	number of MH iterations within one iteration of MCMC to fit Beta and Gamma
hiter	number of first iterations to ignore
burnin	number of MH iterations for h, proportion of variance explained
Vbeta	variance of beta
smallchange	perturbation size for MH algorithm
verbose	if set TRUE, print gamma for each iteration

**Value**

list of posterior beta, gamma, and covariance matrix sigma

**Examples**

```

beta = c(rep(0.5, 3), rep(0,3))
n = 200; T = length(beta); nu = T+5
Sigma = matrix(0.8, T, T); diag(Sigma) = 1
X = as.numeric(scale(rnorm(n)))
error = MASS::mvrnorm(n, rep(0,T), Sigma)
gamma = c(rep(1,3), rep(0,3))
Y = X %*% t(beta) + error; Y = scale(Y)
Phi = matrix(0.5, T, T); diag(Phi) = 1
initial_chain = list(beta = rep(0,T),
                    gamma = rep(0,T),
                    Sigma = Phi,
                    sigmabeta = 1)
result = mmvbvs(X = X,
               Y = Y,
               initial_chain = initial_chain,
               Phi = Phi,
               marcor = colMeans(X*Y, na.rm=TRUE),
               niter=10,
               verbose = FALSE)

```

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plot\_beta

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*Plot the coefficients for each variable for each iteration of MCMC*


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**Description**

Plot the coefficients for each variable for each iteration of MCMC

**Usage**

```
plot_beta(result, title = "")
```

**Arguments**

result            Output object from mmvbvs function  
 title            A string object for the title of the resulting plot

**Value**

ggplot object

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plot\_gamma            *Plot the the inclusion of each variable for each MCMC iteration*

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**Description**

Plot the the inclusion of each variable for each MCMC iteration

**Usage**

```
plot_gamma(result, title = "")
```

**Arguments**

result            Output object from mmvbvs function  
 title            A string object for the title of the resulting plot

**Value**

ggplot object

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plot\_sigma            *Plot the posterior mean of the covariance matrix*

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**Description**

Plot the posterior mean of the covariance matrix

**Usage**

```
plot_sigma(result, title = "")
```

**Arguments**

result            resulting object from mmvbvs function  
 title            A string object for the title of the resulting plot

**Value**

ggplot object

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