

# Package: midnight (via r-universe)

June 3, 2026

**Type** Package

**Title** A 'tidymodels' Engine and Other Extensions for the 'midr' Package

**Version** 0.2.0

**Description** Provides a 'parsnip' engine for the 'midr' package, enabling users to fit, tune, and evaluate Maximum Interpretation Decomposition (MID) models within the 'tidymodels' framework. Developed through research by the Moonlight Seminar 2025, a study group of actuaries from the Institute of Actuaries of Japan, to enhance practical applications of interpretable modeling. Detailed methodology is available in Asashiba et al. (2025)  [<doi:10.48550/arXiv.2506.08338>](https://doi.org/10.48550/arXiv.2506.08338).

**License** MIT + file LICENSE

**Encoding** UTF-8

**Imports** graphics, midr (>= 0.6.0), rlang, Rcpp, stats, utils

**Suggests** colormap, DALEX, ggbeeswarm, ggforce, ggplot2, MetBrewer, parsnip

**RoxygenNote** 7.3.2

**URL** <https://github.com/ryo-asashi/midnight>,  
<https://ryo-asashi.github.io/midnight/>

**BugReports** <https://github.com/ryo-asashi/midnight/issues>

**LinkingTo** Rcpp, RcppEigen

**Config/Needs/website** rmarkdown

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

**Date/Publication** 2026-04-02 21:19:16 UTC

**RemoteUrl** <https://github.com/ryo-asashi/midnight>

**RemoteRef** HEAD

**RemoteSha** 752f8ece54333b8aff278ac32ef82713c1c4c927

## Contents

fastLmMatrix	2
ggmid.midimp	3
nightfall	4
persp.mid	5
<b>Index</b>	<b>7</b>

---

fastLmMatrix	<i>Fit Multivariate Linear Models</i>
--------------	---------------------------------------

---

### Description

fastLmMatrix() estimates the linear model for multivariate response using one of several methods implemented using the Eigen linear algebra library.

### Usage

```
fastLmMatrix(x, ...)

## Default S3 method:
fastLmMatrix(x, y, tol = 1e-07, method = 0L, ...)

## S3 method for class 'formula'
fastLmMatrix(formula, data = list(), method = 0L, ...)
```

### Arguments

x	a model matrix $X$ .
...	optional parameters passed to methods.
y	the response matrix $Y$ .
tol	tolerance for the rank calculation.
method	an integer with value 0 for the column-pivoted QR decomposition, 1 for the unpivoted QR decomposition, 2 for the LLT Cholesky, 3 for the LDLT Cholesky, and 4 for the Jacobi singular value decomposition (SVD). Default is zero.
formula	an object of class "formula" (or one that can be coerced to that class): a symbolic description of the model to be fitted.
data	an optional data frame, list or environment (or object coercible by as.data.frame to a data frame) containing the variables in the model.

### Details

fastLmMatrix() is a performance-optimized version of the standard lm.fit() function. Unlike RcppEigen::fastLm(), it is specifically designed to handle multivariate responses ( $Y$  as a matrix). It leverages the Eigen C++ template library for high-performance linear algebra, providing several decomposition methods with different trade-offs between speed and numerical stability.

**Value**

`fastLmMatrix()` returns a list with the following components:

<code>coefficients</code>	$p \times k$ matrix of coefficients.
<code>fitted.values</code>	$n \times k$ matrix of fitted values.
<code>residuals</code>	$n \times k$ matrix of residuals.
<code>rank</code>	an integer giving the numeric rank of the model matrix $X$ .

**See Also**

[lm.fit](#), [fastLm](#)

---

ggmid.midimp

*Plot MID Importance with ggplot2*

---

**Description**

The **midnight** package extends `midr::ggmid()` to provide modern distribution plots for MID feature importance. Added types include `sina`, `beeswarm`, and violin plots.

**Usage**

```
## S3 method for class 'midimp'
ggmid(object, type = NULL, theme = NULL, terms = NULL, max.terms = 30, ...)
```

**Arguments**

<code>object</code>	a "midimp" object to be visualized.
<code>type</code>	the plotting style. In addition to standard types ("barplot", "boxplot", "dotchart", "heatmap"), this extended method supports "violinplot", "sinaplot", and "beeswarm".
<code>theme</code>	a character string or object defining the color theme. See <a href="#">color.theme</a> for details.
<code>terms</code>	an optional character vector specifying which terms to display.
<code>max.terms</code>	an integer specifying the maximum number of terms to display. Defaults to 30.
<code>...</code>	optional parameters passed on to the layers.

**Details**

This is an S3 method for the `midr::ggmid()` generic for "midimp" objects created by `midr::mid.importance()`. This method replaces the primary layer with modern distribution geoms when `type` is one of the extended options.

**Value**

`ggmid.midimp()` returns a "ggplot" object.

**Note**

This S3 method is **NOT** registered automatically when the **midnight** package is loaded, and activated when `nightfall()` is explicitly called.

**See Also**

`nightfall`, `mid.importance`

---

nightfall

*Transition into and out of Midnight*

---

**Description**

`nightfall()` activates the extended features provided by the **midnight** package. It overrides specific S3 methods (such as `ggmid.midimp`), switches the underlying solvers to highly optimized Eigen-based routines via global options, and applies midnight-themed color palettes.

`daybreak()` reverses these changes, restoring the default behavior, solvers, and themes of the **midr** package.

**Usage**

```
nightfall(methods = TRUE, solvers = TRUE, themes = TRUE)
```

```
daybreak(methods = TRUE, solvers = TRUE, themes = TRUE)
```

**Arguments**

<code>methods</code>	logical. If TRUE, overrides (or restores) the <code>ggmid.midimp</code> S3 method.
<code>solvers</code>	logical. If TRUE, sets (or restores) calculation solvers via <code>options()</code> (e.g., <code>midr.solver.qr</code> , <code>midr.solver.svd</code> ). These optimized solvers can be utilized by specifying the corresponding method in <code>interpret()</code> (e.g., <code>method = "qr"</code> ).
<code>themes</code>	logical. If TRUE, applies (or restores) color themes by setting <code>options()</code> for <code>midr.qualitative</code> , <code>midr.sequential</code> , and <code>midr.diverging</code> .

**Value**

`nightfall()` and `daybreak()` return an invisible list containing the previous options for solvers and themes.

---

persp.mid

*Perspective Plot of MID Effects*

---

### Description

Visualizes the combined effect of two variables from a "mid" object using a 3D perspective plot.

### Usage

```
## S3 method for class 'mid'  
persp(object, xvar, yvar = NULL, ..., xval = NULL, yval = NULL)
```

### Arguments

object	a "mid" object, typically the result of <code>midr::interpret()</code> .
xvar	a character string with the name of the variable for the x-axis. Alternatively, a single string in the format <code>xvar:yvar</code> can be provided, in which case <code>yvar</code> can be omitted.
yvar	a character string with the name of the variable for the y-axis.
...	additional arguments passed on to <code>graphics::persp.default()</code> . Used to customize the plot's appearance, such as view angles ( <code>theta</code> , <code>phi</code> ) or color ( <code>col</code> ).
xval	a numeric or character vector specifying the sequence of values for the x-axis.
yval	a numeric or character vector specifying the sequence of values for the y-axis.

### Details

This is an S3 method for the `persp()` generic that calculates the sum of the main effects of `xvar` and `yvar` and their interaction effect (`xvar:yvar`). The resulting sum is plotted as the height on the z-axis.

### Value

`persp.mid()` invisibly returns the viewing transformation matrix, see [persp](#) for details. This function is primarily called for its side effect of creating a plot.

### See Also

[persp](#)

**Examples**

```
mid <- midr::interpret(mpg ~ wt * hp + factor(am), data = mtcars, lambda = .5)

# Create a basic perspective plot
persp(mid, xvar = "wt", yvar = "hp")

# Customize the plot by passing arguments to graphics::persp.default()
persp(mid, "wt", "hp", theta = 210, phi = 20, col = "lightblue", shade = .5)
persp(mid, "factor(am):wt", theta = 210, shade = .2)
```

# Index

`color.theme`, 3

`daybreak (nightfall)`, 4

`fastLm`, 3

`fastLmMatrix`, 2

`ggmid.midimp`, 3

`lm.fit`, 3

`mid.importance`, 4

`nightfall`, 4, 4

`persp`, 5

`persp.mid`, 5