

Package: smbr2 (via r-universe)

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Title Facilitates Bayesian Analysis using STAN with CmdStanR

Version 0.0.0.9001

Description Facilitates Bayesian Analysis using STAN with CmdStanR.
This builds on smbr, which uses rstan.

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URL <https://github.com/poissonconsulting/smbr2>

BugReports <https://github.com/poissonconsulting/smbr2/issues>

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diagnose	<i>Diagnose Analysis Objects</i>
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Description

Generic function for diagnosing analysis objects.
See documentation for specific methods:

- [diagnose.cmdstan_mcmc_analysis\(\)](#)

Usage

diagnose(x, ...)

Arguments

x	An analysis object.
...	Additional arguments passed to methods.

Value

Diagnostic output (format depends on the analysis type).

`diagnose.cmdstan_mcmc_analysis`*Diagnose CmdStan MCMC Analysis*

Description

Provides diagnostic information for CmdStan MCMC analysis objects.

For more details on diagnostics and how to address issues see:

- <https://mc-stan.org/docs/cmdstan-guide/diagnose.html>

Usage

```
## S3 method for class 'cmdstan_mcmc_analysis'  
diagnose(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_mcmc_analysis</code> object.
<code>...</code>	Additional arguments (unused).

Value

Output from CmdStan's diagnostic function.

`diagnose.cmdstan_pathfinder_analysis`*Diagnose CmdStan Pathfinder Analysis*

Description

Provides diagnostic information for CmdStan Pathfinder analysis objects.

For more details on diagnostics and how to address issues see:

- <https://mc-stan.org/docs/cmdstan-guide/diagnose.html>

Usage

```
### S3 method for class 'cmdstan_pathfinder_analysis'  
diagnose(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_pathfinder_analysis</code> object.
<code>...</code>	Additional arguments (unused).

Value

Output from CmdStan's diagnostic function.

```
diagnose.cmdstan_variational_analysis
```

Diagnose CmdStan Variational Analysis

Description

Provides diagnostic information for CmdStan Variational analysis objects.

For more details on diagnostics and how to address issues see:

- <https://mc-stan.org/docs/cmdstan-guide/diagnose.html>

Usage

```
## S3 method for class 'cmdstan_variational_analysis'
diagnose(x, ...)
```

Arguments

x	A cmdstan_variational_analysis object.
...	Additional arguments (unused).

Value

Output from CmdStan's diagnostic function.

```
glance.cmdstan_laplace_analysis
```

Glance at CmdStanR Laplace Analysis

Description

Provides a one-row summary of Laplace approximation analysis results.

Usage

```
## S3 method for class 'cmdstan_laplace_analysis'
glance(x, ...)
```

Arguments

x	A cmdstan_laplace_analysis object.
...	Additional arguments (unused).

Details**Diagnostic interpretation:**

- **return_code**: Should be 0. Non-zero values indicate the optimizer failed to find the posterior mode, invalidating the Laplace approximation.

Value

A tibble with one row containing:

n Number of observations in the dataset

K Number of parameters

converged Logical indicating optimization convergence

return_code Optimization return code for mode finding. **Problem indicators**: Non-zero values indicate mode-finding issues

See Also

[embr::glance\(\)](#)

glance.cmdstan_mcmc_analysis

Glance at CmdStanR MCMC Analysis

Description

Provides a one-row summary of key diagnostics for MCMC analysis results.

Usage

```
## S3 method for class 'cmdstan_mcmc_analysis'
glance(
  x,
  ...,
  max_perc_divergent = getOption("mb.prop_divergent", 0.002) * 100
)
```

Arguments

x A cmdstan_mcmc_analysis object.

... Additional arguments (unused).

max_perc_divergent

A percentage indicating the maximum number of divergent transitions allowed for determining if the model converged. Generally set via [embr::set_analysis_mode\(\)](#).

Details

Diagnostic interpretation:

- **Divergent transitions:** Should ideally be 0. Any divergent transitions indicate the sampler had numerical issues and results may be unreliable.
- **Max treedepth:** Should ideally be 0 or very low. High values suggest the sampler is working hard and may benefit from reparameterization. Increasing max treedepth is also an option but it is generally discouraged since it increases model fitting times without addressing the underlying issue. High max treedepth does not necessarily indicate convergence issues.
- **E-BFMI:** Should be > 0.2 . Values < 0.2 suggest poor adaptation, often requiring longer warmup or model reparameterization.

However, the sensitivity to problematic diagnostics depends on the analysis mode set via `embr::set_analysis_mode()`. The 'paper' mode is the only mode that requires divergent transitions to be 0% – all other modes accept some level of tolerance.

Value

A tibble with one row containing:

n Number of observations in the dataset

K Number of parameters

nchains Number of MCMC chains

niters Number of iterations per chain (post-warmup)

nthin Thinning interval

converged Logical indicating convergence. TRUE if: `max(rhat)` is less than or equal to its threshold, `min(ESS)` is greater than or equal to its threshold, and `perc_divergent` is less than or equal to its threshold. Thresholds are determined by the analysis mode set by `embr::set_analysis_mode()`.

perc_divergent Percentage of divergent transitions across all chains. **Problem indicators:** Any value $> 0\%$ indicates sampling issues

perc_max_treedepth Percentage of transitions that hit maximum tree depth. **Problem indicators:** Values $> 0\%$ may indicate inefficient sampling

ebfmi Minimum Energy Bayesian Fraction of Missing Information across chains. **Problem indicators:** Values < 0.2 indicate poor adaptation/warmup

See Also

`embr::glance()`, `diagnose()`

`glance.cmdstan_optimize_analysis`*Glance at CmdStanR Optimization Analysis*

Description

Provides a one-row summary of optimization analysis results.

Usage

```
## S3 method for class 'cmdstan_optimize_analysis'  
glance(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_optimize_analysis</code> object.
<code>...</code>	Additional arguments (unused).

Details

Diagnostic interpretation:

- **return_code**: Should be 0. Non-zero values indicate the optimizer encountered issues (e.g., 1 = max iterations reached, 2 = convergence issues).

Value

A tibble with one row containing:

n Number of observations in the dataset

K Number of parameters

converged Logical indicating optimization convergence

return_code Optimization return code. **Problem indicators**: Non-zero values indicate optimization issues

See Also

[embr::glance\(\)](#)

`glance.cmdstan_pathfinder_analysis`*Glance at CmdStanR Pathfinder Analysis*

Description

Provides a one-row summary of key diagnostics for Pathfinder analysis results.

Usage

```
## S3 method for class 'cmdstan_pathfinder_analysis'  
glance(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_pathfinder_analysis</code> object.
<code>...</code>	Additional arguments (unused).

Details

Diagnostic interpretation:

- **return_code**: Should be 0. Non-zero values indicate pathfinder failed to find a good approximation.

Value

A tibble with one row containing:

n Number of observations in the dataset

K Number of parameters

converged Logical indicating pathfinder convergence

return_code Pathfinder return code. **Problem indicators**: Non-zero values indicate pathfinder issues

See Also

[embr::glance\(\)](#), [diagnose\(\)](#)

`glance.cmdstan_variational_analysis`*Glance at CmdStanR Variational Analysis*

Description

Provides a one-row summary of variational inference analysis results.

Usage

```
## S3 method for class 'cmdstan_variational_analysis'
glance(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_variational_analysis</code> object.
<code>...</code>	Additional arguments (unused).

Details

Diagnostic interpretation:

- **return_code**: Should be 0. Non-zero values indicate the variational algorithm failed to converge to a stable ELBO (Evidence Lower BOund).

Value

A tibble with one row containing:

n Number of observations in the dataset

K Number of parameters

converged Logical indicating ELBO convergence

return_code Optimization return code. **Problem indicators**: Non-zero values indicate convergence issues

See Also

[embr::glance\(\)](#), [diagnose\(\)](#)

is.cmdstan_analysis *Is a CmdStan Analysis*

Description

Tests whether x is an object of class 'cmdstan_analysis'

Usage

```
is.cmdstan_analysis(x)
```

Arguments

x The object to test.

Value

A flag indicating whether the test was positive.

is.cmdstan_mcmc_analysis
 Is a CmdStan MCMC Analysis

Description

Tests whether x is an object of class 'cmdstan_mcmc_analysis'

Usage

```
is.cmdstan_mcmc_analysis(x)
```

Arguments

x The object to test.

Value

A flag indicating whether the test was positive.

```
print.cmdstan_diagnostics
```

Print Method for CmdStan MCMC Diagnostics

Description

Print Method for CmdStan MCMC Diagnostics

Usage

```
## S3 method for class 'cmdstan_diagnostics'  
print(x, ...)
```

Arguments

<code>x</code>	A <code>cmdstan_mcmc_diagnostics</code> object.
<code>...</code>	Additional arguments (currently unused).

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