Package ‘BayesLogit’

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License GPL (>= 3)
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Polya-Gamma Random Variates

Description

Generate random variates from the Polya-Gamma distribution.

Usage

```r
rpg(num=1, h=1, z=0.0)
rpg.gamma(num=1, h=1, z=0.0, trunc=200)
rpg.devroye(num=1, h=1, z=0.0)
rpg.sp(num=1, h=1, z=0.0)
rpg.gamma.R(num=1, h=1, z=0.0, trunc=200)
rpg.devroye.R(num=1, h=1, z=0.0)
```

Arguments

- `num` The number of random variates to simulate.
- `h` Shape parameter. \( h \) must be \( \geq 1 \) if not using sum of gammas method.
- `z` Parameter associated with tilting.
- `trunc` The number of elements used in sum of gammas approximation.

Details

A random variable \( X \) with distribution \( \text{PG}(h,z) \) is distributed like

\[
X \sim \sum_{k=1}^{\infty} \frac{G(h,1)}{(2\pi^2(k-1/2)^2 + z^2/2)}.
\]

The density for \( X \) may be derived by exponentially tilting the \( \text{PG}(h,0) \) density:

\[
p(x|h, z) \propto \exp(-xz^2/2)p(x|h, 0).
\]

Different methods for generating this random variable are implemented, each of which is useful for certain parameters. The parameters supplied by the user automatically determine which method is used. One may manually call each routine using `rpg.METHOD`. Functions ending in ".R" are pure R implementations.

You may call `rpg` when \( n \) and \( z \) are vectors.
Value

This function returns num Polya-Gamma samples.

References


Examples

```r
h = c(1, 2, 3);
z = c(4, 5, 6);

## Devroye-like method -- only use if h contains integers, preferably small integers.
X = rpg.devroye(100, h, z);

h = c(1.2, 2.3, 3.2);
z = c(4, 5, 6);

## Sum of gammas method -- this is slow.
X = rpg.gamma(100, h, z);

h = c(1, 4, 2.3);
z = c(4, 5, 6);

## Hybrid method -- automatically chooses best procedure.
X = rpg(100, h, z);
```
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