"Expression": a do-it-yourself prior

This prior allow the user to define an expression for the log-density of any (univariate) prior $\log \pi(\theta)$, as a function of the corresponding θ (which is in the internal scale; be aware).

The expression is evaluated using the muparser-library¹, with some local configuration changes to make it more "R"-like in style. The format is

```
expression: <statement>; <statement>; ...; return(<value>)
```

where "<statement>" is any regular statement (more below) and value returned, "<value>" is the value for the log-density of the prior, evaluated at the current value for θ .

The following expression implements the normal prior (in not a good way...)

expression:

```
mean = 0; sigma = 1;
dens = 1/sqrt(2*pi) * 1/sigma * exp(-0.5*(x-mean)^2/sigma^2);
logdens = log(dens);
return(logdens)
```

All variables in the expression are initialised with the current value of θ before the expression is evaluated. In this way, the variable x in this example will be θ .

Notes

- 1. return (x) (with a space before "(.)") is NOT allowed, it must be return(x).
- 2. A ";" is needed to terminate each expression, a newline DOES NOT terminate an expression.
- 3. You can use "_" in variable-names, like log_precision = <whatever>; see the following example.

Known functions

Known functions (besides common math-functions like " $\exp(\cdot)$ ", " $\sin(\cdot)$ ", etc...) are

- gamma(x) is the Gamma-function and lgamma(x) is its log, and the derivaties digamma(x) and trigamma(x) (see ?gamma in R).
- pi is π
- x^y is expressed as either x^y or pow(x;y)

Example

¹See http://muparser.sourceforge.net/ for more documentation