

The `lstbayes` package

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1 Introduction

This package provides language drivers for the `listings` package for the several Bayesian modeling languages: BUGS, JAGS, and Stan.

2 Usage

See the documentation of the `listings` package.

3 Implementation

```
1 \RequirePackage{listings}
```

3.1 BUGS

Language driver for BUGS, including WinBUGS and OpenBUGS. The driver is based on OpenBUGS v. 3.2.3.

```
2 \lstdefinlanguage{BUGS}{
3   morekeywords={1}{for,in,model,T,I,C},%
4   morecomment={1}{\#},%
5   sensitive=true,%
6   alsoletter={.},%
7   otherkeywords={<-,~},%
8   literate={<-}{\leftarrow}1 {~}{\sim}1%
9 }
10 \lstalias[] {OpenBUGS} [] {BUGS}
11 \lstalias[] {WinBUGS} [] {BUGS}
```

3.2 JAGS

Language driver for JAGS. The driver is based on JAGS version 3.4.0 (Sept 4, 2013).

```
12 \lstdefinlanguage[] {JAGS} [] {BUGS}{
```

```

13 morekeywords=[1]{data,var,const},%
14 morecomment=[n]{/*}{*/}%
15 }

```

3.3 Stan

Language driver for Stan. The driver is based on Stan modeling language version 2.10.0.

```

16 \lstdefinlanguage{Stan}{
17   morekeywords=[1]{functions,data,parameters,transformed,model,generated,quantities,%
18     for,in,while,print,if,else,lower,upper,increment_log_prob,T,return,%
19     reject,integrate_ode,integrate_ode_bdf,integrate_ode_rk45,target},%
20   morekeywords=[2]{int,real,vector,%
21     ordered,positive_ordered,simplex,unit_vector,%
22     row_vector,matrix,%
23     cholesky_factor_corr,cholesky_factor_cov,%
24     cor_matrix,cov_matrix,%
25     void},%
26   morekeywords=[3]{%
27     Phi,%
28     Phi_approx,%
29     abs,%
30     acos,%
31     acosh,%
32     append_col,%
33     append_row,%
34     asin,%
35     asinh,%
36     atan,%
37     atan2,%
38     atanh,%
39     bernoulli_cdf,%
40     bernoulli_cdf_log,%
41     bernoulli_lccdf,%
42     bernoulli_lcdf,%
43     bernoulli_logit_lpmf,%
44     bernoulli_logit_lpmf,%
45     bernoulli_lpmf,%
46     bernoulli_lpmf,%
47     bernoulli_rng,%
48     bessel_first_kind,%
49     bessel_second_kind,%
50     beta_binomial_cdf,%
51     beta_binomial_cdf_log,%
52     beta_binomial_lccdf,%
53     beta_binomial_lcdf,%
54     beta_binomial_lpmf,%
55     beta_binomial_lpmf,%
56     beta_binomial_rng,%

```

```

57     beta_cdf,%
58     beta_cdf_log,%
59     beta_lccdf,%
60     beta_lcdf,%
61     beta_lpdf,%
62     beta_lpdf,%
63     beta_rng,%
64     binary_log_loss,%
65     binomial_cdf,%
66     binomial_cdf_log,%
67     binomial_coefficient_log,%
68     binomial_lccdf,%
69     binomial_lcdf,%
70     binomial_logit_lpmf,%
71     binomial_logit_lpmf,%
72     binomial_lpmf,%
73     binomial_lpmf,%
74     binomial_rng,%
75     block,%
76     categorical_logit_lpmf,%
77     categorical_logit_lpmf,%
78     categorical_lpmf,%
79     categorical_lpmf,%
80     categorical_rng,%
81     cauchy_cdf,%
82     cauchy_cdf_log,%
83     cauchy_lccdf,%
84     cauchy_lcdf,%
85     cauchy_lpdf,%
86     cauchy_lpdf,%
87     cauchy_rng,%
88     cbrt,%
89     ceil,%
90     chi_square_cdf,%
91     chi_square_cdf_log,%
92     chi_square_lccdf,%
93     chi_square_lcdf,%
94     chi_square_lpdf,%
95     chi_square_lpdf,%
96     chi_square_rng,%
97     cholesky_decompose,%
98     col,%
99     cols,%
100    columns_dot_product,%
101    columns_dot_self,%
102    cos,%
103    cosh,%
104    crossprod,%
105    csr_extract_u,%
106    csr_extract_v,%

```

```

107     csr_extract_w,%
108     csr_matrix_times_vector,%
109     csr_to_dense_matrix,%
110     cumulative_sum,%
111     determinant,%
112     diag_matrix,%
113     diag_post_multiply,%
114     diag_pre_multiply,%
115     diagonal,%
116     digamma,%
117     dims,%
118     dirichlet_lpdf,%
119     dirichlet_lpdf,%
120     dirichlet_rng,%
121     distance,%
122     dot_product,%
123     dot_self,%
124     double_exponential_cdf,%
125     double_exponential_cdf_log,%
126     double_exponential_lccdf,%
127     double_exponential_lcdf,%
128     double_exponential_lpdf,%
129     double_exponential_lpdf,%
130     double_exponential_rng,%
131     e,%
132     eigenvalues_sym,%
133     eigenvectors_sym,%
134     erf,%
135     erfc,%
136     exp,%
137     exp2,%
138     exp_mod_normal_cdf,%
139     exp_mod_normal_cdf_log,%
140     exp_mod_normal_lccdf,%
141     exp_mod_normal_lcdf,%
142     exp_mod_normal_lpdf,%
143     exp_mod_normal_lpdf,%
144     exp_mod_normal_rng,%
145     expm1,%
146     exponential_cdf,%
147     exponential_cdf_log,%
148     exponential_lccdf,%
149     exponential_lcdf,%
150     exponential_lpdf,%
151     exponential_lpdf,%
152     exponential_rng,%
153     fabs,%
154     falling_factorial,%
155     fdim,%
156     floor,%

```

```

157     fma,%
158     fmax,%
159     fmin,%
160     fmod,%
161     frechet_cdf,%
162     frechet_cdf_log,%
163     frechet_lccdf,%
164     frechet_lcdf,%
165     frechet_lpdf,%
166     frechet_lpdf,%
167     frechet_rng,%
168     gamma_cdf,%
169     gamma_cdf_log,%
170     gamma_lccdf,%
171     gamma_lcdf,%
172     gamma_lpdf,%
173     gamma_lpdf,%
174     gamma_p,%
175     gamma_q,%
176     gamma_rng,%
177     gaussian_dlm_obs_lpdf,%
178     gaussian_dlm_obs_lpdf,%
179     get_lp,%
180     gumbel_cdf,%
181     gumbel_cdf_log,%
182     gumbel_lccdf,%
183     gumbel_lcdf,%
184     gumbel_lpdf,%
185     gumbel_lpdf,%
186     gumbel_rng,%
187     head,%
188     hypergeometric_lpmf,%
189     hypergeometric_lpmf,%
190     hypergeometric_rng,%
191     hypot,%
192     if_else,%
193     inc_beta,%
194     int_step,%
195     inv,%
196     inv_chi_square_cdf,%
197     inv_chi_square_cdf_log,%
198     inv_chi_square_lccdf,%
199     inv_chi_square_lcdf,%
200     inv_chi_square_lpdf,%
201     inv_chi_square_lpdf,%
202     inv_chi_square_rng,%
203     inv_cloglog,%
204     inv_gamma_cdf,%
205     inv_gamma_cdf_log,%
206     inv_gamma_lccdf,%

```

```

207     inv_gamma_lcdf,%
208     inv_gamma_lpdf,%
209     inv_gamma_lpdf,%
210     inv_gamma_rng,%
211     inv_logit,%
212     inv_phi,%
213     inv_sqrt,%
214     inv_square,%
215     inv_wishart_lpdf,%
216     inv_wishart_lpdf,%
217     inv_wishart_rng,%
218     inverse,%
219     inverse_spd,%
220     is_inf,%
221     is_nan,%
222     lbeta,%
223     lchoose,%
224     lgamma,%
225     lkj_corr_cholesky_lpdf,%
226     lkj_corr_cholesky_lpdf,%
227     lkj_corr_cholesky_rng,%
228     lkj_corr_lpdf,%
229     lkj_corr_lpdf,%
230     lkj_corr_rng,%
231     lmgamma,%
232     lmultiply,%
233     log,%
234     log10,%
235     log1m,%
236     log1m_exp,%
237     log1m_inv_logit,%
238     log1p,%
239     log1p_exp,%
240     log2,%
241     log_determinant,%
242     log_diff_exp,%
243     log_falling_factorial,%
244     log_inv_logit,%
245     log_mix,%
246     log_rising_factorial,%
247     log_softmax,%
248     log_sum_exp,%
249     logistic_cdf,%
250     logistic_cdf_log,%
251     logistic_lccdf,%
252     logistic_lcdf,%
253     logistic_lpdf,%
254     logistic_lpdf,%
255     logistic_rng,%
256     logit,%

```

```

257     lognormal_cdf,%
258     lognormal_cdf_log,%
259     lognormal_lccdf,%
260     lognormal_lcdf,%
261     lognormal_lpdf,%
262     lognormal_lpdf,%
263     lognormal_rng,%
264     machine_precision,%
265     max,%
266     mdivide_left_tri_low,%
267     mdivide_right_tri_low,%
268     mean,%
269     min,%
270     modified_bessel_first_kind,%
271     modified_bessel_second_kind,%
272     multi_gp_cholesky_lpdf,%
273     multi_gp_cholesky_lpdf,%
274     multi_gp_lpdf,%
275     multi_gp_lpdf,%
276     multi_normal_cholesky_lpdf,%
277     multi_normal_cholesky_lpdf,%
278     multi_normal_cholesky_rng,%
279     multi_normal_lpdf,%
280     multi_normal_lpdf,%
281     multi_normal_prec_lpdf,%
282     multi_normal_prec_lpdf,%
283     multi_normal_rng,%
284     multi_student_t_lpdf,%
285     multi_student_t_lpdf,%
286     multi_student_t_rng,%
287     multinomial_lpmf,%
288     multinomial_lpmf,%
289     multinomial_rng,%
290     multiply_log,%
291     multiply_lower_tri_self_transpose,%
292     neg_binomial_2_cdf,%
293     neg_binomial_2_cdf_log,%
294     neg_binomial_2_lccdf,%
295     neg_binomial_2_lcdf,%
296     neg_binomial_2_log_lpmf,%
297     neg_binomial_2_log_lpmf,%
298     neg_binomial_2_log_rng,%
299     neg_binomial_2_lpmf,%
300     neg_binomial_2_lpmf,%
301     neg_binomial_2_rng,%
302     neg_binomial_cdf,%
303     neg_binomial_cdf_log,%
304     neg_binomial_lccdf,%
305     neg_binomial_lcdf,%
306     neg_binomial_lpmf,%

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307     neg_binomial_lpmf,%
308     neg_binomial_rng,%
309     negative_infinity,%
310     normal_cdf,%
311     normal_cdf_log,%
312     normal_lccdf,%
313     normal_lcdf,%
314     normal_lpdf,%
315     normal_lpdf,%
316     normal_rng,%
317     not_a_number,%
318     num_elements,%
319     ordered_logistic_lpmf,%
320     ordered_logistic_lpmf,%
321     ordered_logistic_rng,%
322     owens_t,%
323     pareto_cdf,%
324     pareto_cdf_log,%
325     pareto_lccdf,%
326     pareto_lcdf,%
327     pareto_lpdf,%
328     pareto_lpdf,%
329     pareto_rng,%
330     pareto_type_2_cdf,%
331     pareto_type_2_cdf_log,%
332     pareto_type_2_lccdf,%
333     pareto_type_2_lcdf,%
334     pareto_type_2_lpdf,%
335     pareto_type_2_lpdf,%
336     pareto_type_2_rng,%
337     pi,%
338     poisson_cdf,%
339     poisson_cdf_log,%
340     poisson_lccdf,%
341     poisson_lcdf,%
342     poisson_log_lpmf,%
343     poisson_log_lpmf,%
344     poisson_log_rng,%
345     poisson_lpmf,%
346     poisson_lpmf,%
347     poisson_rng,%
348     positive_infinity,%
349     pow,%
350     prod,%
351     qr_Q,%
352     qr_R,%
353     quad_form,%
354     quad_form_diag,%
355     quad_form_sym,%
356     rank,%

```



```

357     rayleigh_cdf,%
358     rayleigh_cdf_log,%
359     rayleigh_lccdf,%
360     rayleigh_lcdf,%
361     rayleigh_lpdf,%
362     rayleigh_lpdf,%
363     rayleigh_rng,%
364     rep_array,%
365     rep_matrix,%
366     rep_row_vector,%
367     rep_vector,%
368     rising_factorial,%
369     round,%
370     row,%
371     rows,%
372     rows_dot_product,%
373     rows_dot_self,%
374     scaled_inv_chi_square_cdf,%
375     scaled_inv_chi_square_cdf_log,%
376     scaled_inv_chi_square_lccdf,%
377     scaled_inv_chi_square_lcdf,%
378     scaled_inv_chi_square_lpdf,%
379     scaled_inv_chi_square_lpdf,%
380     scaled_inv_chi_square_rng,%
381     sd,%
382     segment,%
383     sin,%
384     singular_values,%
385     sinh,%
386     size,%
387     skew_normal_cdf,%
388     skew_normal_cdf_log,%
389     skew_normal_lccdf,%
390     skew_normal_lcdf,%
391     skew_normal_lpdf,%
392     skew_normal_lpdf,%
393     skew_normal_rng,%
394     softmax,%
395     sort_asc,%
396     sort_desc,%
397     sort_indices_asc,%
398     sort_indices_desc,%
399     sqrt,%
400     sqrt2,%
401     square,%
402     squared_distance,%
403     step,%
404     student_t_cdf,%
405     student_t_cdf_log,%
406     student_t_lccdf,%

```

```

407     student_t_lcdf,%
408     student_t_lpdf,%
409     student_t_lpdf,%
410     student_t_rng,%
411     sub_col,%
412     sub_row,%
413     sum,%
414     tail,%
415     tan,%
416     tanh,%
417     tcrossprod,%
418     tgamma,%
419     to_array_1d,%
420     to_array_2d,%
421     to_matrix,%
422     to_row_vector,%
423     to_vector,%
424     trace,%
425     trace_gen_quad_form,%
426     trace_quad_form,%
427     trigamma,%
428     trunc,%
429     uniform_cdf,%
430     uniform_cdf_log,%
431     uniform_lccdf,%
432     uniform_lcdf,%
433     uniform_lpdf,%
434     uniform_lpdf,%
435     uniform_rng,%
436     variance,%
437     von_mises_lpdf,%
438     von_mises_lpdf,%
439     von_mises_rng,%
440     weibull_cdf,%
441     weibull_cdf_log,%
442     weibull_lccdf,%
443     weibull_lcdf,%
444     weibull_lpdf,%
445     weibull_lpdf,%
446     weibull_rng,%
447     wiener_lpdf,%
448     wiener_lpdf,%
449     wishart_lpdf,%
450     wishart_lpdf,%
451     wishart_rng
452 },%
453 otherkeywords={<-,~,+=,=},%
454 sensitive=true,%
455 morecomment=[1]{\#},%
456 morecomment=[1]{//},%

```

```
457 morecomment=[n]{/*}{*/},%
458 string=[d]"%,
459 \literate={<-}{\leftarrow$}1 {\sim}{\sim$}1%
460 }
```

Change History

2015-09-26	General: Converted to DTX file . . . 1	2015-09-28	General: Fix README. Add key-words for all built-in functions that are in Stan v2.8.0. 1
2015-09-27	General: Fix README 1		

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Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

Symbols	\lstalias 10, 11	R
\# 4, 455		\RequirePackage 1
L	\lstdefinlanguage .	S
\leftarrow 8, 459 2, 12, 16	\sim 8, 459