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 \lstdefinelanguage{BUGS}{
 3   morekeywords=[1]{for,in,model,T,I,C},%
 4   morecomment=[l]{\#},%
 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 \lstdefinelanguage[]{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
2.9.0.

```
16 \lstdefinelanguage{Stan}{
17    morekeywords=[1]{functions,data,parameters,transformed,model,generated,quantities,%
18      for,in,while,print,if,else,lp__,lower,upper,increment_log_prob,T,return,%
19      reject,integrate_ode},%
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      coor_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,%
40      bernoulli_ccdf_log,%
41      bernoulli_cdf,%
42      bernoulli_cdf_log,%
43      bernoulli_log,%
44      bernoulli_logit,%
45      bernoulli_logit_log,%
46      bernoulli_rng,%
47      bessel_first_kind,%
48      bessel_second_kind,%
49      beta,%
50      beta_binomial,%
51      beta_binomial_ccdf_log,%
52      beta_binomial_cdf,%
53      beta_binomial_cdf_log,%
54      beta_binomial_log,%
55      beta_binomial_rng,%
56      beta_ccdf_log,%
```

```
57      beta_cdf,%
58      beta_cdf_log,%
59      beta_log,%
60      beta_rng,%
61      binary_log_loss,%
62      binomial,%
63      binomial_ccdf_log,%
64      binomial_cdf,%
65      binomial_cdf_log,%
66      binomial_coefficient_log,%
67      binomial_log,%
68      binomial_logit,%
69      binomial_logit_log,%
70      binomial_rng,%
71      block,%
72      categorical,%
73      categorical_log,%
74      categorical_logit,%
75      categorical_logit_log,%
76      categorical_rng,%
77      cauchy,%
78      cauchy_ccdf_log,%
79      cauchy_cdf,%
80      cauchy_cdf_log,%
81      cauchy_log,%
82      cauchy_rng,%
83      cbrt,%
84      ceil,%
85      chi_square,%
86      chi_square_ccdf_log,%
87      chi_square_cdf,%
88      chi_square_cdf_log,%
89      chi_square_log,%
90      chi_square_rng,%
91      cholesky_decompose,%
92      col,%
93      cols,%
94      columns_dot_product,%
95      columns_dot_self,%
96      cos,%
97      cosh,%
98      crossprod,%
99      csr_extract_u,%
100     csr_extract_v,%
101     csr_extract_w,%
102     csr_matrix_times_vector,%
103     csr_to_dense_matrix,%
104     cumulative_sum,%
105     determinant,%
106     diag_matrix,%
```

```
107    diag_post_multiply,%
108    diag_pre_multiply,%
109    diagonal,%
110    digamma,%
111    dims,%
112    dirichlet,%
113    dirichlet_log,%
114    dirichlet_rng,%
115    distance,%
116    dot_product,%
117    dot_self,%
118    double_exponential,%
119    double_exponential_ccdf_log,%
120    double_exponential_cdf,%
121    double_exponential_cdf_log,%
122    double_exponential_log,%
123    double_exponential_rng,%
124    e,%
125    eigenvalues_sym,%
126    eigenvectors_sym,%
127    erf,%
128    erfc,%
129    exp,%
130    exp2,%
131    exp_mod_normal,%
132    exp_mod_normal_ccdf_log,%
133    exp_mod_normal_cdf,%
134    exp_mod_normal_cdf_log,%
135    exp_mod_normal_log,%
136    exp_mod_normal_rng,%
137    expm1,%
138    exponential,%
139    exponential_ccdf_log,%
140    exponential_cdf,%
141    exponential_cdf_log,%
142    exponential_log,%
143    exponential_rng,%
144    fabs,%
145    falling_factorial,%
146    fdim,%
147    floor,%
148    fma,%
149    fmax,%
150    fmin,%
151    fmod,%
152    frechet,%
153    frechet_ccdf_log,%
154    frechet_cdf,%
155    frechet_cdf_log,%
156    frechet_log,%
```

```
157    frechet_rng,%
158    gamma,%
159    gamma_ccdf_log,%
160    gamma_cdf,%
161    gamma_cdf_log,%
162    gamma_log,%
163    gamma_p,%
164    gamma_q,%
165    gamma_rng,%
166    gaussian_dlm_obs,%
167    gaussian_dlm_obs_log,%
168    get_lp,%
169    gumbel,%
170    gumbel_ccdf_log,%
171    gumbel_cdf,%
172    gumbel_cdf_log,%
173    gumbel_log,%
174    gumbel_rng,%
175    head,%
176    hypergeometric,%
177    hypergeometric_log,%
178    hypergeometric_rng,%
179    hypot,%
180    if_else,%
181    int_step,%
182    inv,%
183    inv_chi_square,%
184    inv_chi_square_ccdf_log,%
185    inv_chi_square_cdf,%
186    inv_chi_square_cdf_log,%
187    inv_chi_square_log,%
188    inv_chi_square_rng,%
189    inv_cloglog,%
190    inv_gamma,%
191    inv_gamma_ccdf_log,%
192    inv_gamma_cdf,%
193    inv_gamma_cdf_log,%
194    inv_gamma_log,%
195    inv_gamma_rng,%
196    inv_logit,%
197    inv_phi,%
198    inv_sqrt,%
199    inv_square,%
200    inv_wishart,%
201    inv_wishart_log,%
202    inv_wishart_rng,%
203    inverse,%
204    inverse_spd,%
205    is_inf,%
206    is_nan,%
```

```
207     lbeta,%
208     lgamma,%
209     lkj_corr,%
210     lkj_corr_cholesky,%
211     lkj_corr_cholesky_log,%
212     lkj_corr_cholesky_rng,%
213     lkj_corr_log,%
214     lkj_corr_rng,%
215     lmgamma,%
216     log,%
217     log10,%
218     log1m,%
219     log1m_exp,%
220     log1m_inv_logit,%
221     log1p,%
222     log1p_exp,%
223     log2,%
224     log_determinant,%
225     log_diff_exp,%
226     log_falling_factorial,%
227     log_inv_logit,%
228     log_mix,%
229     log_rising_factorial,%
230     log_softmax,%
231     log_sum_exp,%
232     logistic,%
233     logistic_ccdf_log,%
234     logistic_cdf,%
235     logistic_cdf_log,%
236     logistic_log,%
237     logistic_rng,%
238     logit,%
239     lognormal,%
240     lognormal_ccdf_log,%
241     lognormal_cdf,%
242     lognormal_cdf_log,%
243     lognormal_log,%
244     lognormal_rng,%
245     machine_precision,%
246     max,%
247     mdivide_left_tri_low,%
248     mdivide_right_tri_low,%
249     mean,%
250     min,%
251     modified_bessel_first_kind,%
252     modified_bessel_second_kind,%
253     multi_gp,%
254     multi_gp_cholesky,%
255     multi_gp_cholesky_log,%
256     multi_gp_log,%
```

```
257    multi_normal,%
258    multi_normal_cholesky,%
259    multi_normal_cholesky_log,%
260    multi_normal_cholesky_rng,%
261    multi_normal_log,%
262    multi_normal_prec,%
263    multi_normal_prec_log,%
264    multi_normal_rng,%
265    multi_student_t,%
266    multi_student_t_log,%
267    multi_student_t_rng,%
268    multinomial,%
269    multinomial_log,%
270    multinomial_rng,%
271    multiply_log,%
272    multiply_lower_tri_self_transpose,%
273    neg_binomial,%
274    neg_binomial_2,%
275    neg_binomial_2_ccdf_log,%
276    neg_binomial_2_cdf,%
277    neg_binomial_2_cdf_log,%
278    neg_binomial_2_log,%
279    neg_binomial_2_log,%
280    neg_binomial_2_log_log,%
281    neg_binomial_2_log_rng,%
282    neg_binomial_2_rng,%
283    neg_binomial_ccdf_log,%
284    neg_binomial_cdf,%
285    neg_binomial_cdf_log,%
286    neg_binomial_log,%
287    neg_binomial_rng,%
288    negative_infinity,%
289    normal,%
290    normal_ccdf_log,%
291    normal_cdf,%
292    normal_cdf_log,%
293    normal_log,%
294    normal_rng,%
295    not_a_number,%
296    num_elements,%
297    ordered_logistic,%
298    ordered_logistic_log,%
299    ordered_logistic_rng,%
300    owens_t,%
301    pareto,%
302    pareto_ccdf_log,%
303    pareto_cdf,%
304    pareto_cdf_log,%
305    pareto_log,%
306    pareto_rng,%
```

```
307    pareto_type_2,%
308    pareto_type_2_ccdf_log,%
309    pareto_type_2_cdf,%
310    pareto_type_2_cdf_log,%
311    pareto_type_2_log,%
312    pareto_type_2_rng,%
313    pi,%
314    poisson,%
315    poisson_ccdf_log,%
316    poisson_cdf,%
317    poisson_cdf_log,%
318    poisson_log,%
319    poisson_log,%
320    poisson_log_log,%
321    poisson_log_rng,%
322    poisson_rng,%
323    positive_infinity,%
324    pow,%
325    prod,%
326    qr_Q,%
327    qr_R,%
328    quad_form,%
329    quad_form_diag,%
330    quad_form_sym,%
331    rank,%
332    rayleigh,%
333    rayleigh_ccdf_log,%
334    rayleigh_cdf,%
335    rayleigh_cdf_log,%
336    rayleigh_log,%
337    rayleigh_rng,%
338    rep_array,%
339    rep_matrix,%
340    rep_row_vector,%
341    rep_vector,%
342    rising_factorial,%
343    round,%
344    row,%
345    rows,%
346    rows_dot_product,%
347    rows_dot_self,%
348    scaled_inv_chi_square,%
349    scaled_inv_chi_square_ccdf_log,%
350    scaled_inv_chi_square_cdf,%
351    scaled_inv_chi_square_cdf_log,%
352    scaled_inv_chi_square_log,%
353    scaled_inv_chi_square_rng,%
354    sd,%
355    segment,%
356    sin,%
```

```
357    singular_values,%
358    sinh,%
359    size,%
360    skew_normal,%
361    skew_normal_ccdf_log,%
362    skew_normal_cdf,%
363    skew_normal_cdf_log,%
364    skew_normal_log,%
365    skew_normal_rng,%
366    softmax,%
367    sort_asc,%
368    sort_desc,%
369    sort_indices_asc,%
370    sort_indices_desc,%
371    sqrt,%
372    sqrt2,%
373    square,%
374    squared_distance,%
375    step,%
376    student_t,%
377    student_t_ccdf_log,%
378    student_t_cdf,%
379    student_t_cdf_log,%
380    student_t_log,%
381    student_t_rng,%
382    sub_col,%
383    sub_row,%
384    sum,%
385    tail,%
386    tan,%
387    tanh,%
388    tcrossprod,%
389    tgamma,%
390    to_array_1d,%
391    to_array_2d,%
392    to_matrix,%
393    to_row_vector,%
394    to_vector,%
395    trace,%
396    trace_gen_quad_form,%
397    trace_quad_form,%
398    trigamma,%
399    trunc,%
400    uniform,%
401    uniform_ccdf_log,%
402    uniform_cdf,%
403    uniform_cdf_log,%
404    uniform_log,%
405    uniform_rng,%
406    variance,%
```

```
407     von_mises,%
408     von_mises_log,%
409     von_mises_rng,%
410     weibull,%
411     weibull_ccdf_log,%
412     weibull_cdf,%
413     weibull_cdf_log,%
414     weibull_log,%
415     weibull_rng,%
416     wiener,%
417     wiener_log,%
418     wishart,%
419     wishart_log,%
420     wishart_rng
421  },%
422  otherkeywords={<-,~},%
423  sensitive=true,%
424  morecomment=[l]{\#},%
425  morecomment=[l]{//},%
426  morecomment=[n]{/*}{*/},%
427  string=[d]"%,
428  literate={<-}{{$\leftarrow$}}1 {~}{{$\sim$}}1%
429 }
```

Change History

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