

Summary of results for GBM_alpha_1_sigma_4_x0_100

June 22, 2020

M = 10

m = 1

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

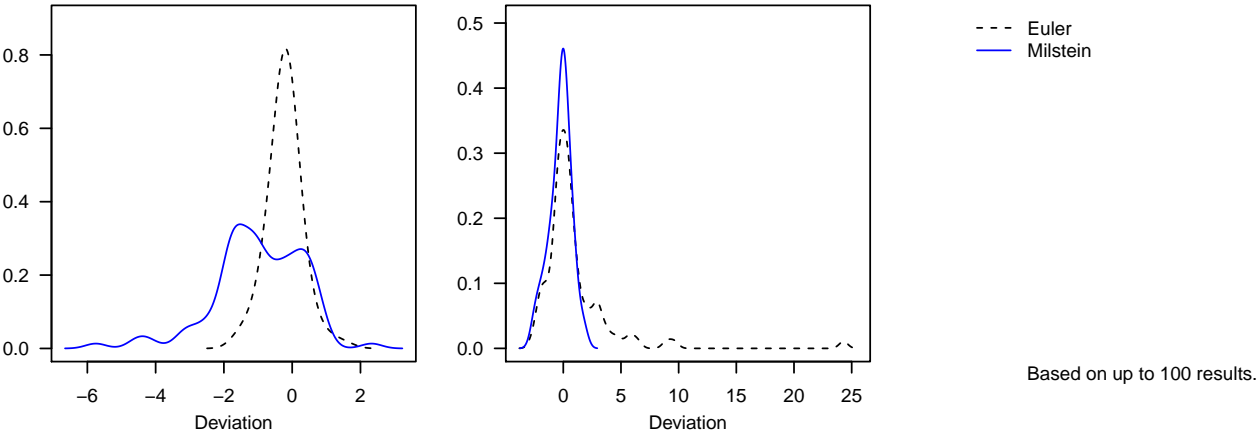


Table 1: RMSE

	alpha	sigma2
Euler	0.542	3.307
Milstein	1.642	0.991

Posterior median

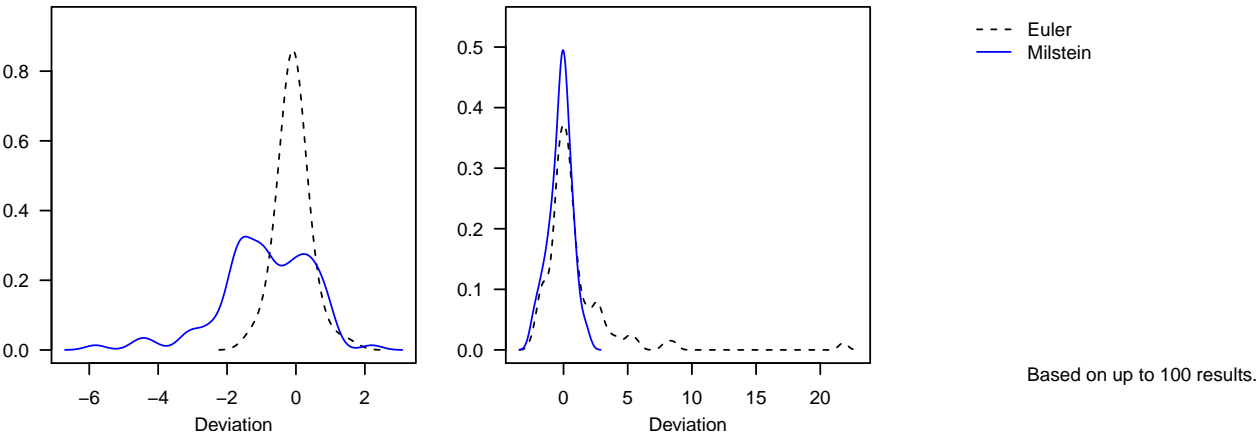


Table 2: RMSE

	alpha	sigma2
Euler	0.479	2.961
Milstein	1.609	0.927

Posterior variance and covariance

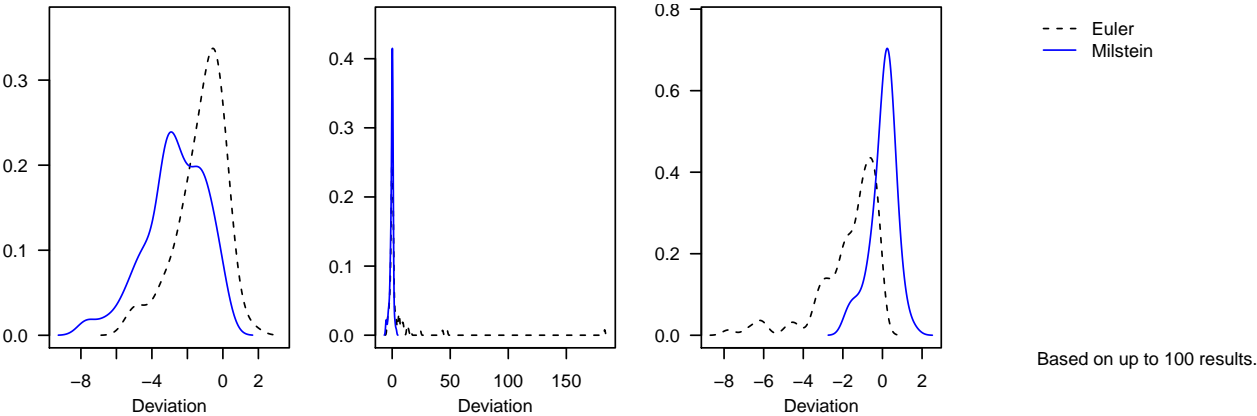


Table 3: RMSE

	alpha	sigma2	covariance
Euler	1.845	19.953	2.291
Milstein	3.193	1.484	0.651

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
Euler	26706004	1195953	1045564	214519
Milstein	7642971	505112	90308	46196

Acceptance rates

	ARparam mean	ARparam sd
td_E	0.602	0.011
td_M	0.318	0.090

$m = 2$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 3

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
142587	7340104	3168718	4

ratio of negative proposals and number of iterations:

	DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
min	0.0000000	0.0000448	0.0000411	0.0e+00
max	0.0078372	0.0692960	0.0690917	6.2e-06
median	0.0000044	0.0035788	0.0061269	0.0e+00
mean	0.0005290	0.0081841	0.0112184	1.0e-07

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

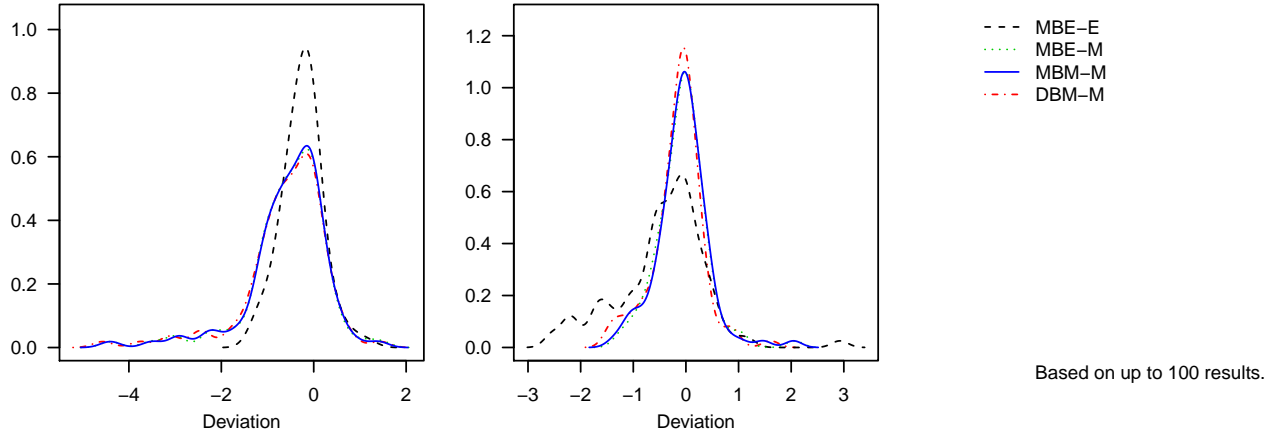


Table 8: RMSE

	alpha	sigma2
MBE-E	0.502	0.963
MBE-M	1.044	0.475
MBM-M	1.035	0.494
DBM-M	1.095	0.501

Posterior median

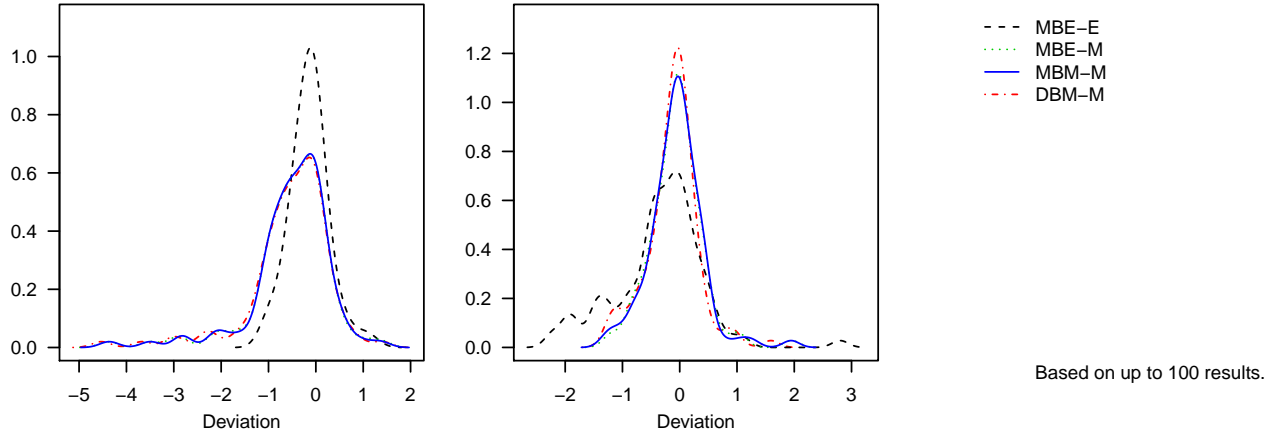


Table 9: RMSE

	alpha	sigma2
MBE-E	0.430	0.848
MBE-M	0.995	0.455
MBM-M	0.986	0.467
DBM-M	1.038	0.469

Posterior variance and covariance

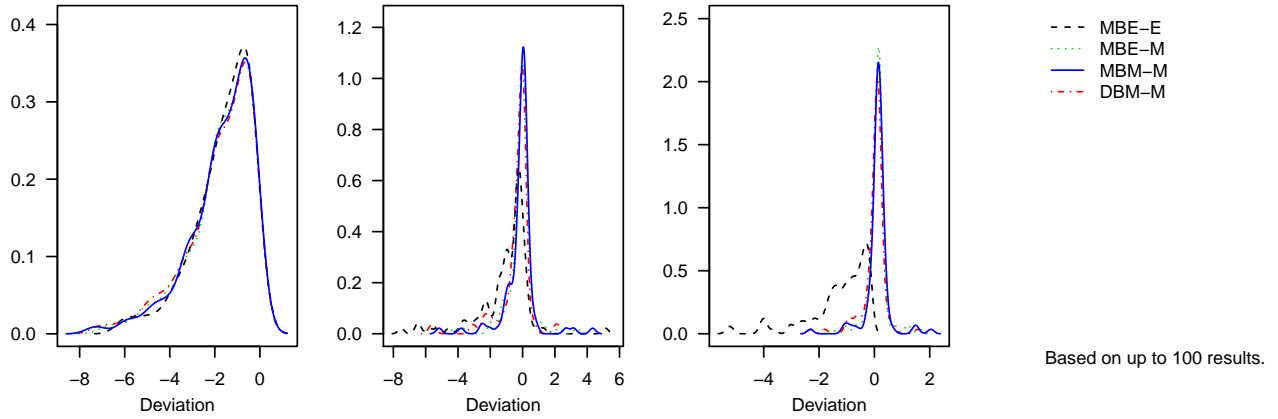


Table 10: RMSE

	alpha	sigma2	covariance
MBE-E	2.092	2.024	1.673
MBE-M	2.215	0.894	0.390
MBM-M	2.240	1.052	0.469
DBM-M	2.317	1.169	0.441

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	9037133	225937	204569	37597
MBE-M	2828831	84906	13294	10654
MBM-M	329363	8090	3591	2456
DBM-M	2724875	71547	15701	13235

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.718	0.067	0.539	0.008
MBE-M	0.599	0.102	0.355	0.100
MBM-M	1.000	0.000	0.356	0.100
DBM-M	0.660	0.100	0.359	0.098

$m = 5$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 570

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
263	410939	199985	304

ratio of negative proposals and number of iterations:

	DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
min	0.0e+00	0.0000010	0.0000019	0.0000000
max	4.1e-05	0.0062145	0.0124017	0.0005281
median	0.0e+00	0.0001652	0.0004103	0.0000000
mean	1.8e-06	0.0005717	0.0013122	0.0000372

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

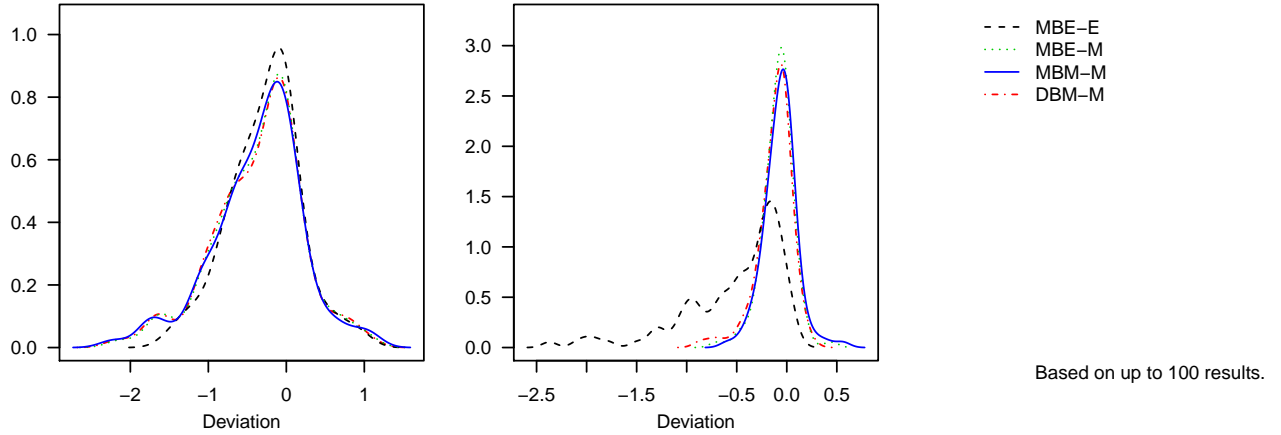


Table 15: RMSE

	alpha	sigma2
MBE-E	0.535	0.727
MBE-M	0.665	0.172
MBM-M	0.683	0.174
DBM-M	0.677	0.214

Posterior median

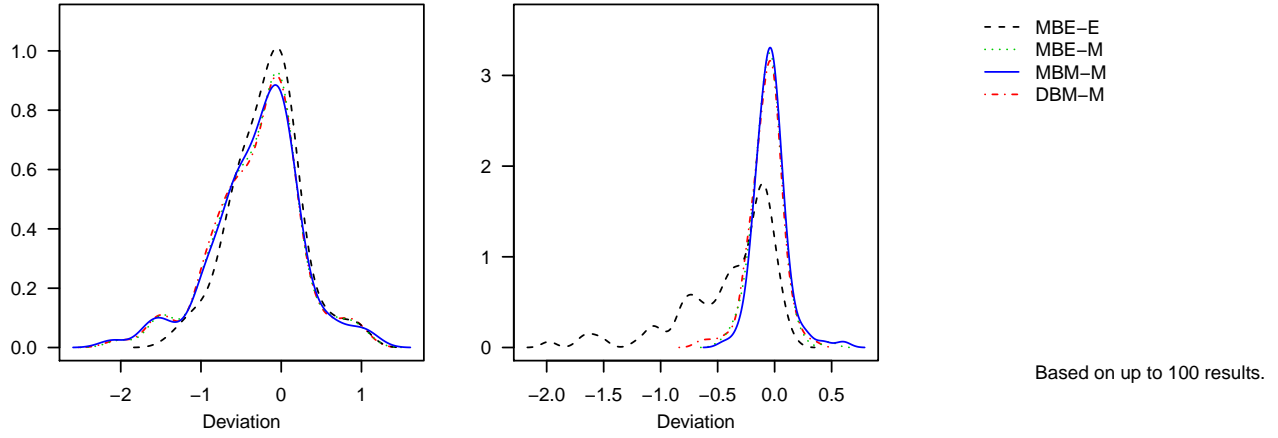


Table 16: RMSE

	alpha	sigma2
MBE-E	0.469	0.585
MBE-M	0.607	0.143
MBM-M	0.623	0.143
DBM-M	0.617	0.162

Posterior variance and covariance

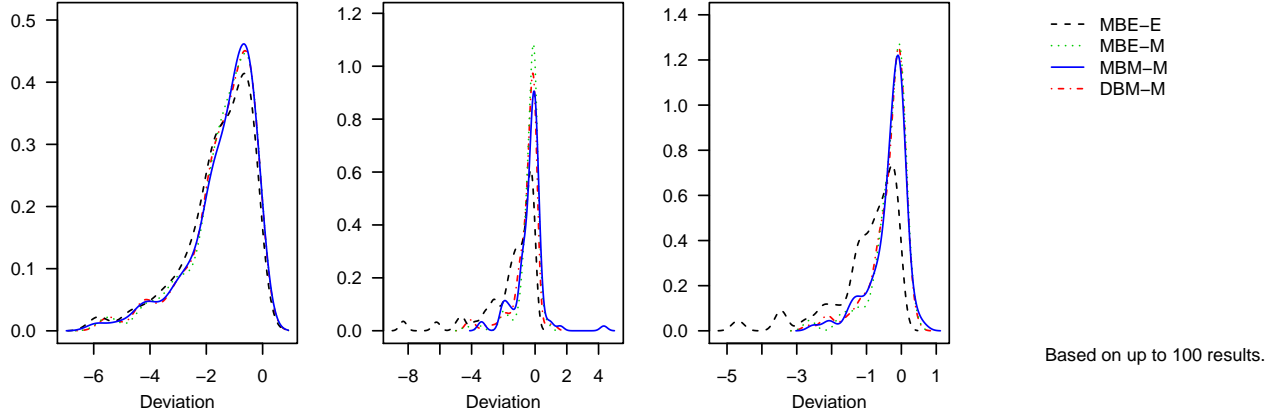


Table 17: RMSE

	alpha	sigma2	covariance
MBE-E	2.016	2.223	1.409
MBE-M	1.826	0.802	0.634
MBM-M	1.847	0.963	0.639
DBM-M	1.842	1.048	0.670

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	7249137	206450	68672	11910
MBE-M	1533202	56714	6380	3355
MBM-M	83370	4852	592	241
DBM-M	1483576	55189	7433	3827

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.804	0.044	0.406	0.005
MBE-M	0.708	0.071	0.359	0.035
MBM-M	0.890	0.047	0.358	0.036
DBM-M	0.772	0.065	0.360	0.034

ARpath mean	ARpath sd	ARparam mean	ARparam sd

M = 20

m = 1

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

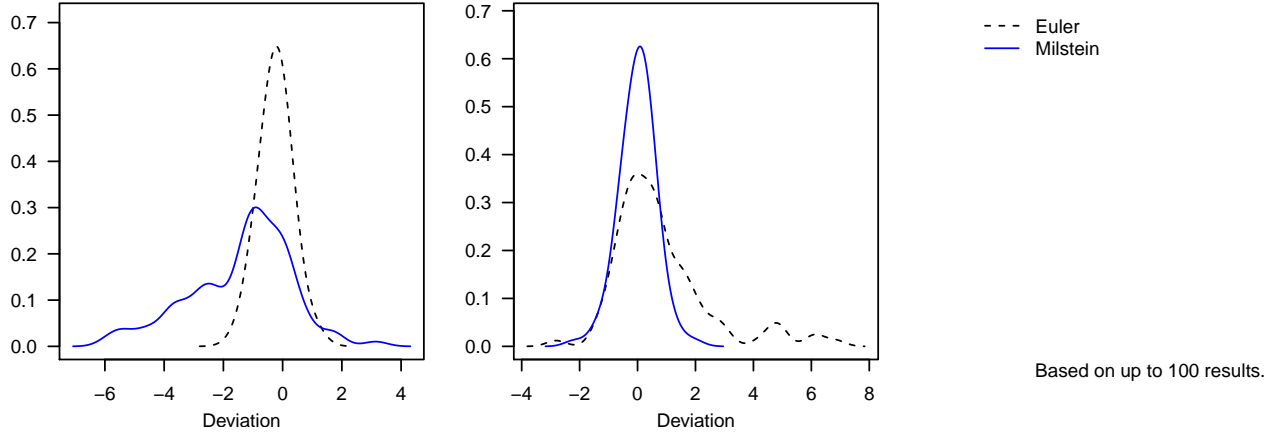


Table 20: RMSE

	alpha	sigma2
Euler	0.562	1.875
Milstein	2.211	0.619

Posterior median

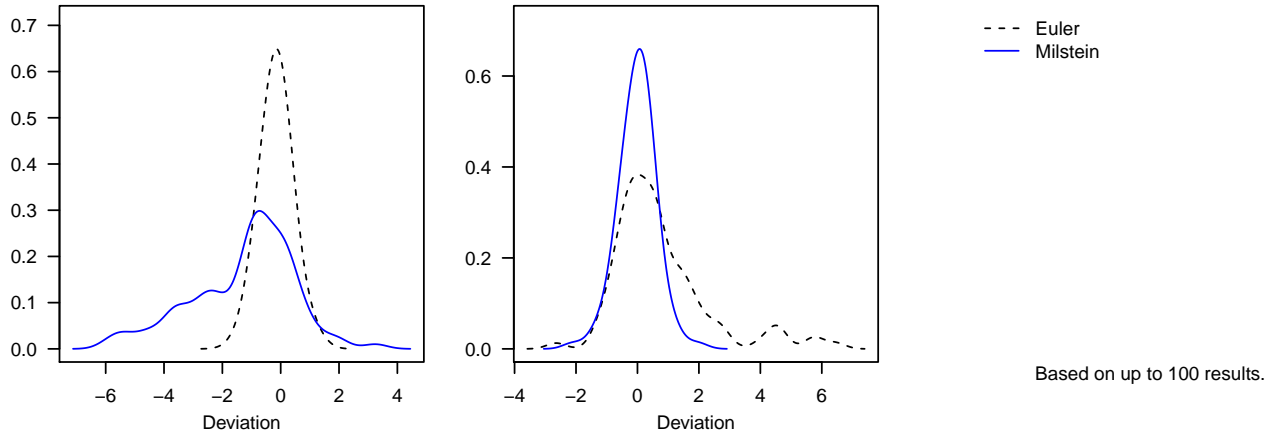


Table 21: RMSE

	alpha	sigma2
Euler	0.521	1.765
Milstein	2.173	0.598

Posterior variance and covariance

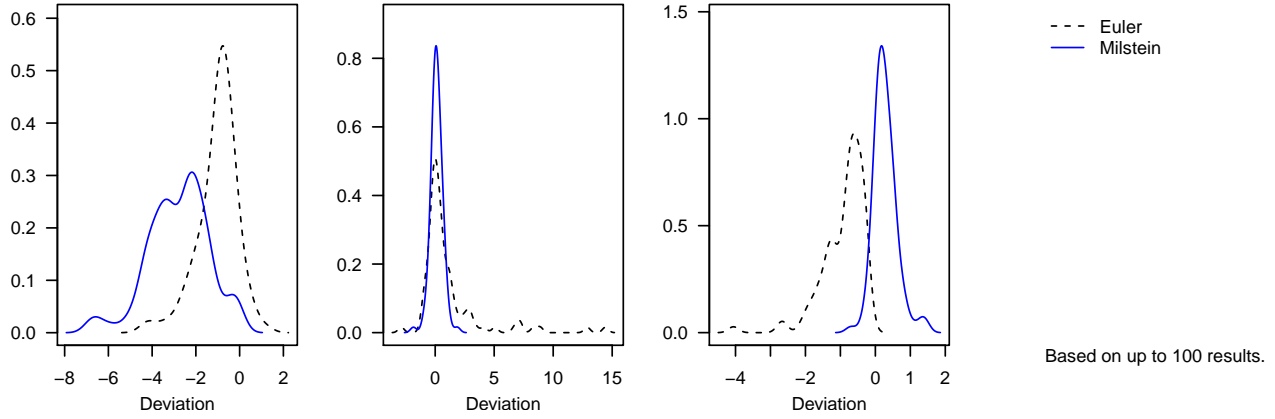


Table 22: RMSE

	alpha	sigma2	covariance
Euler	1.368	2.874	1.097
Milstein	3.115	0.504	0.430

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
Euler	25836918	1603138	1037849	164033
Milstein	4443643	112359	66063	33115

Acceptance rates

	ARparam mean	ARparam sd
td_E	0.528	0.005
td_M	0.292	0.085

$m = 2$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 1

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
17	620986	187885	1

ratio of negative proposals and number of iterations:

	DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
min	0e+00	0.0000018	0.0000020	0.0e+00
max	5e-06	0.0124046	0.0116513	3.1e-06
median	0e+00	0.0002133	0.0003525	0.0e+00
mean	1e-07	0.0007082	0.0010142	0.0e+00

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

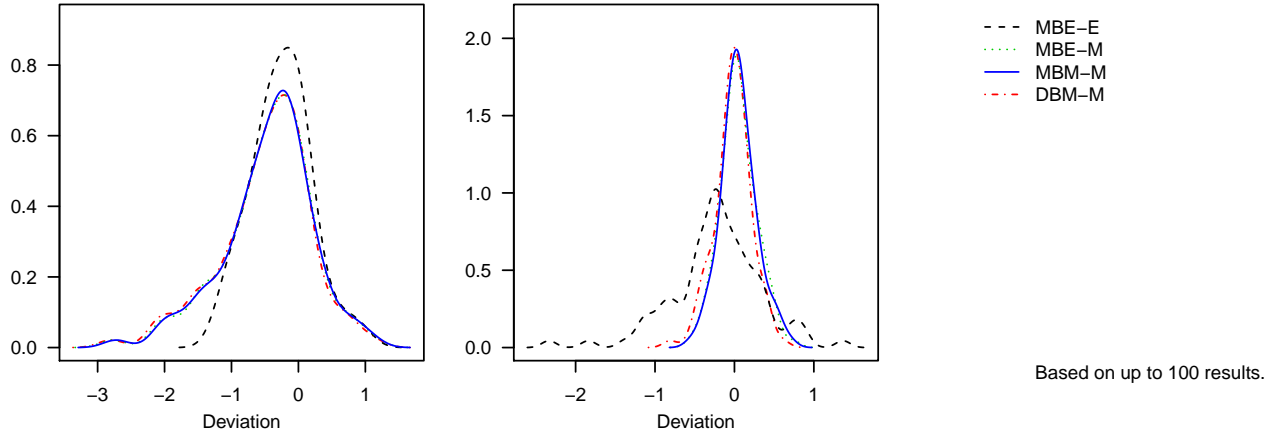


Table 27: RMSE

	alpha	sigma2
MBE-E	0.517	0.606
MBE-M	0.811	0.231
MBM-M	0.806	0.229
DBM-M	0.841	0.229

Posterior median

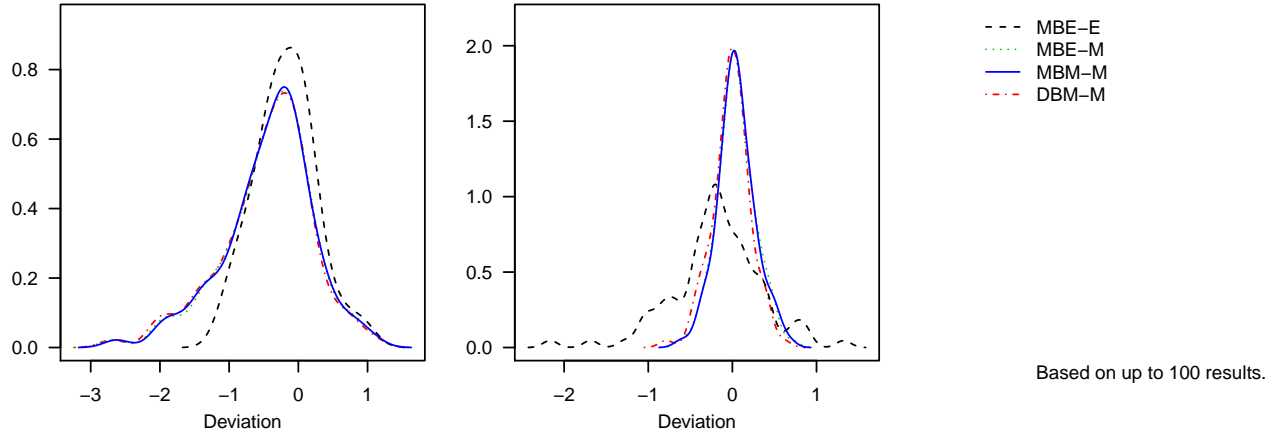


Table 28: RMSE

	alpha	sigma2
MBE-E	0.477	0.563
MBE-M	0.781	0.227
MBM-M	0.778	0.227
DBM-M	0.808	0.223

Posterior variance and covariance

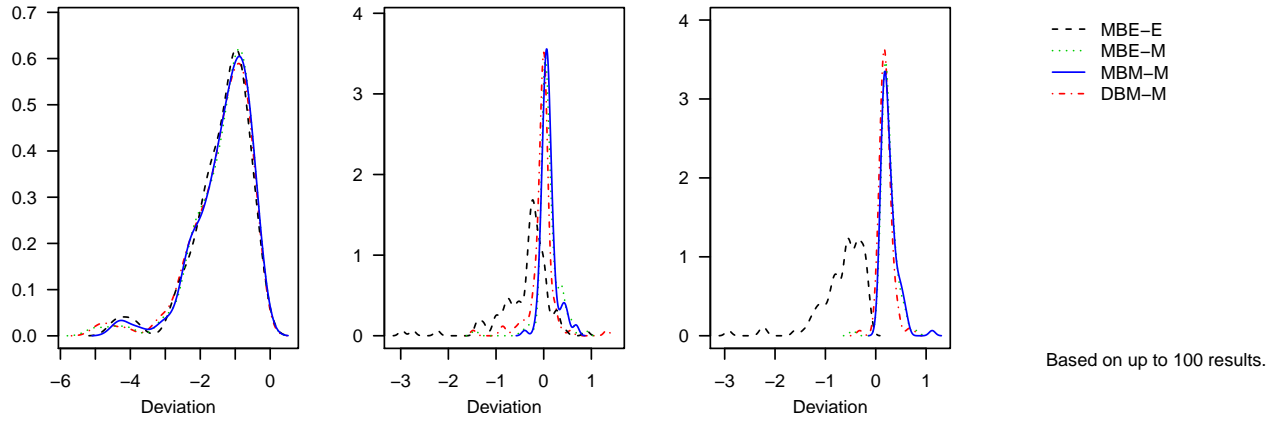


Table 29: RMSE

	alpha	sigma2	covariance
MBE-E	1.610	0.688	0.803
MBE-M	1.593	0.256	0.291
MBM-M	1.556	0.191	0.301
DBM-M	1.643	0.285	0.231

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	8919383	619151	126631	27179
MBE-M	1879002	118413	11061	5984
MBM-M	316136	21265	4343	1713
DBM-M	1828917	122937	14889	7282

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.778	0.040	0.451	0.003
MBE-M	0.706	0.056	0.366	0.053
MBM-M	1.000	0.000	0.367	0.052
DBM-M	0.765	0.047	0.368	0.051

$m = 5$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 43

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
0	7315	2121	2

ratio of negative proposals and number of iterations:

	DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
min	0	0.0000000	0.0000000	0.00e+00
max	0	0.0003045	0.0005088	1.08e-05
median	0	0.0000015	0.0000023	0.00e+00
mean	0	0.0000106	0.0000238	2.00e-07

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

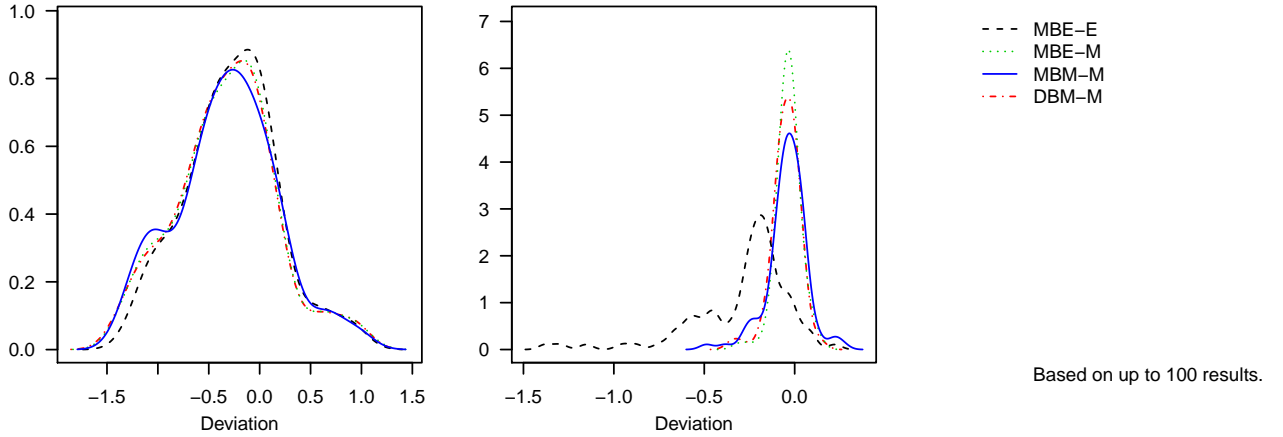


Table 34: RMSE

	alpha	sigma2
MBE-E	0.533	0.398
MBE-M	0.590	0.074
MBM-M	0.596	0.117
DBM-M	0.592	0.091

Posterior median

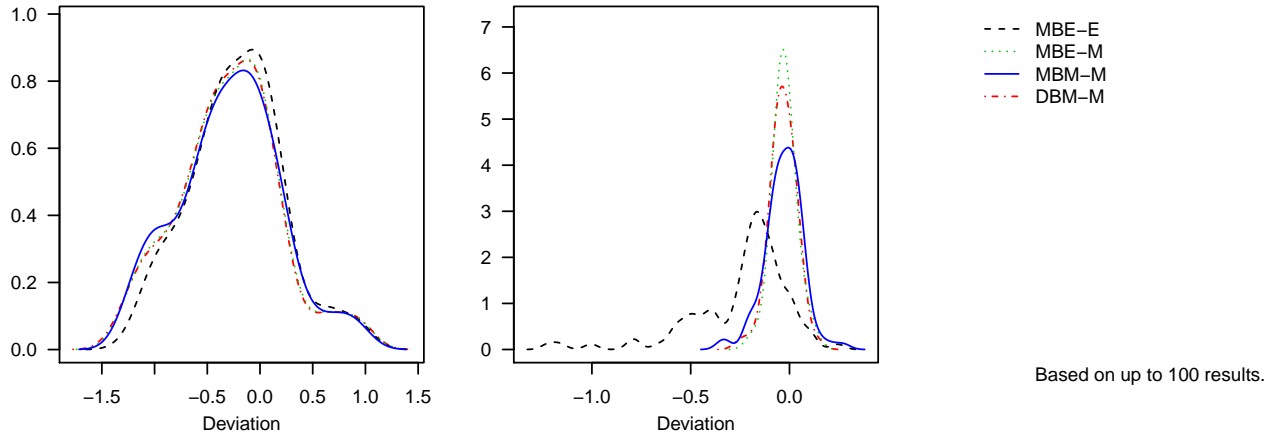


Table 35: RMSE

	alpha	sigma2
MBE-E	0.497	0.346
MBE-M	0.559	0.065
MBM-M	0.562	0.100
DBM-M	0.563	0.074

Posterior variance and covariance

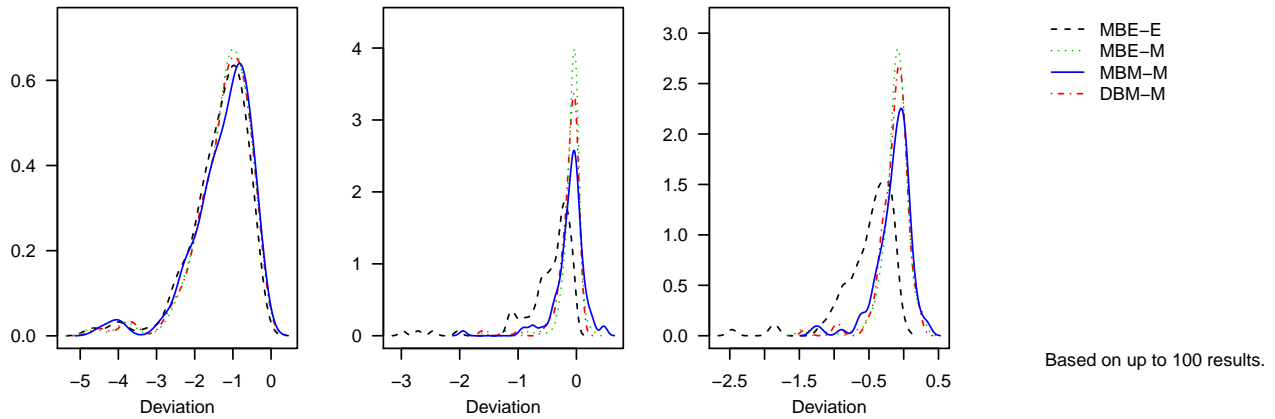


Table 36: RMSE

	alpha	sigma2	covariance
MBE-E	1.573	0.706	0.633
MBE-M	1.450	0.217	0.260
MBM-M	1.491	0.320	0.296
DBM-M	1.450	0.276	0.267

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	7034020	499050	39847	6517
MBE-M	919768	61386	3406	922
MBM-M	83971	7611	453	109
DBM-M	901874	61897	3818	890

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.850	0.024	0.316	0.002
MBE-M	0.781	0.035	0.302	0.006
MBM-M	0.950	0.022	0.302	0.006
DBM-M	0.836	0.028	0.302	0.005

ARpath mean	ARpath sd	ARparam mean	ARparam sd

M = 50

m = 1

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

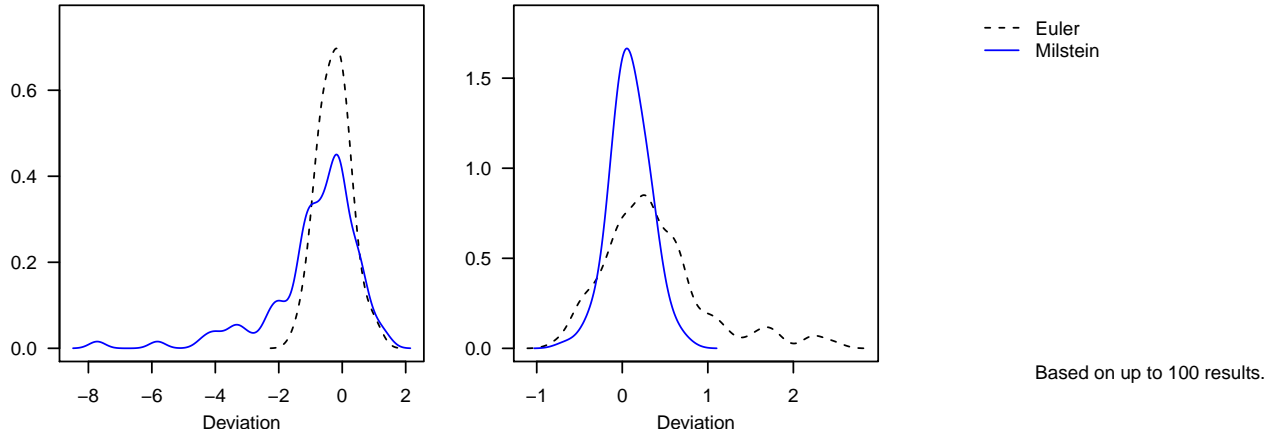


Table 39: RMSE

	alpha	sigma2
Euler	0.571	0.718
Milstein	1.677	0.244

Posterior median

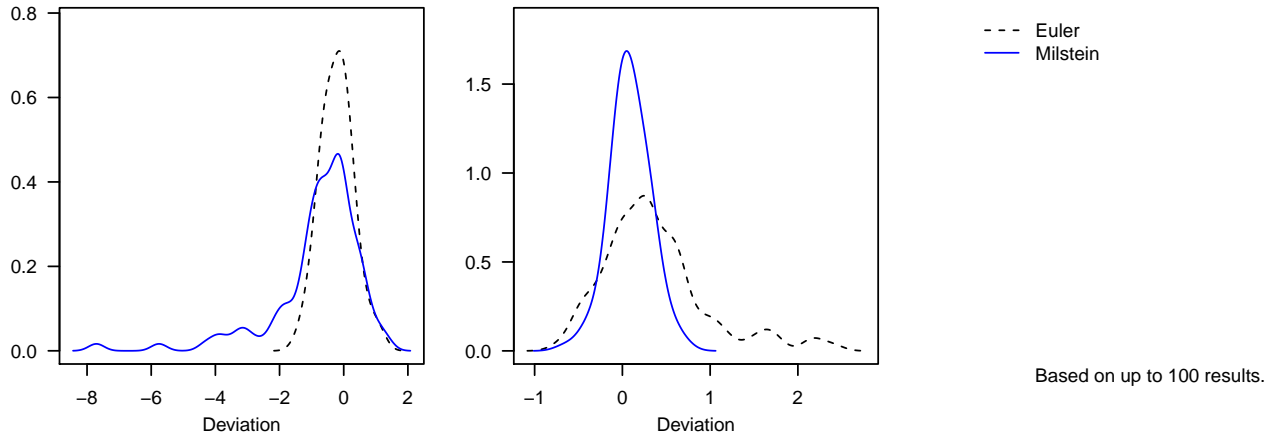


Table 40: RMSE

	alpha	sigma2
Euler	0.551	0.700
Milstein	1.610	0.241

Posterior variance and covariance

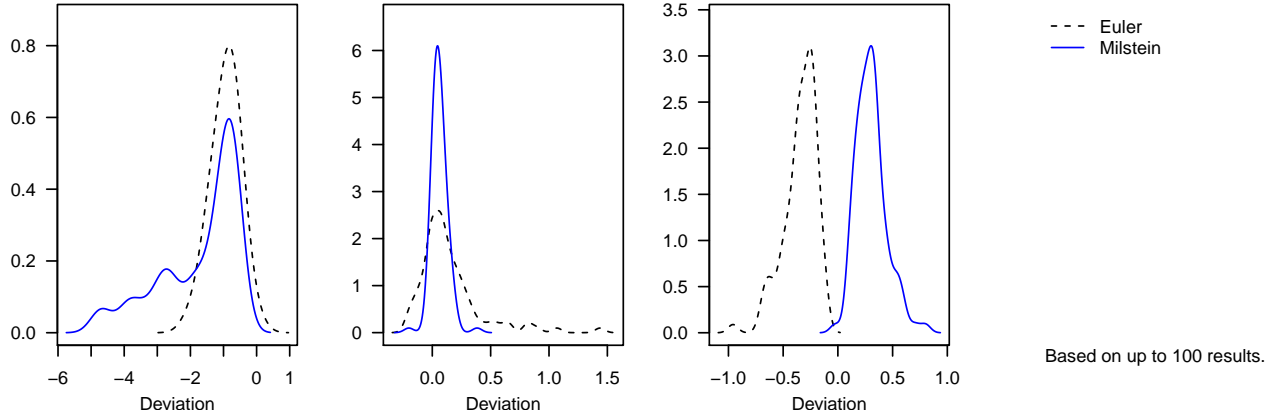


Table 41: RMSE

	alpha	sigma2	covariance
Euler	1.026	0.307	0.376
Milstein	2.114	0.089	0.333

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
Euler	23942553	1588856	941400	103836
Milstein	2075797	121388	58670	17664

Acceptance rates

	ARparam mean	ARparam sd
td_E	0.405	0.002
td_M	0.337	0.055

$m = 2$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 0

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
0	229	31	0

ratio of negative proposals and number of iterations:

	DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
min	0	0e+00	0.0e+00	0
max	0	5e-06	6.7e-06	0
median	0	0e+00	0.0e+00	0
mean	0	3e-07	3.0e-07	0

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

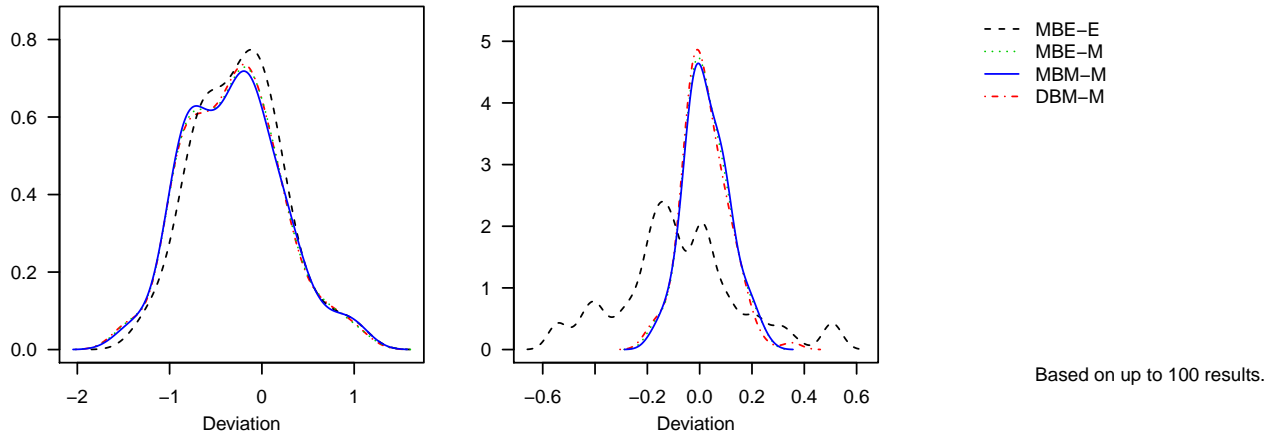


Table 46: RMSE

	alpha	sigma2
MBE-E	0.542	0.243
MBE-M	0.601	0.088
MBM-M	0.604	0.088
DBM-M	0.601	0.091

Posterior median

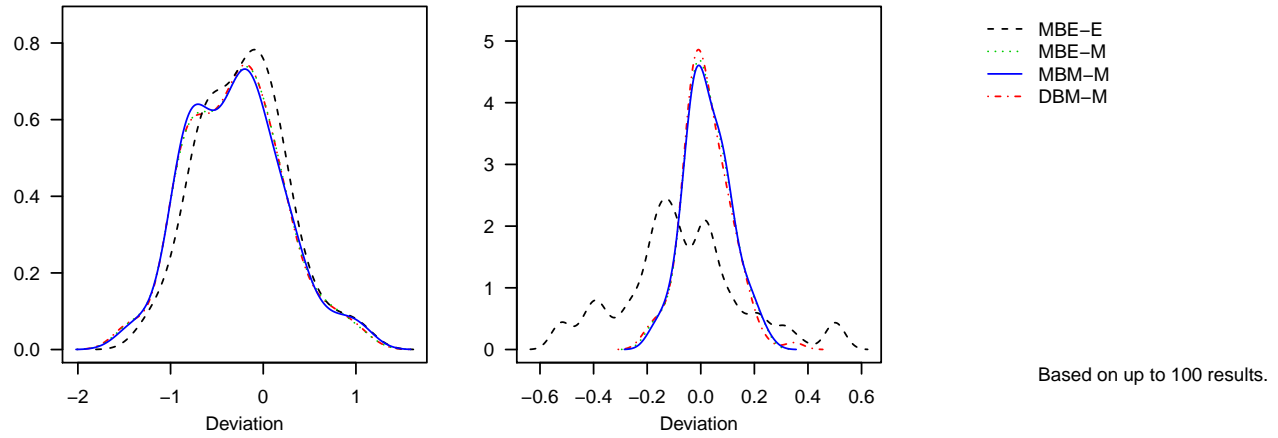


Table 47: RMSE

	alpha	sigma2
MBE-E	0.526	0.235
MBE-M	0.592	0.088
MBM-M	0.597	0.089
DBM-M	0.593	0.091

Posterior variance and covariance

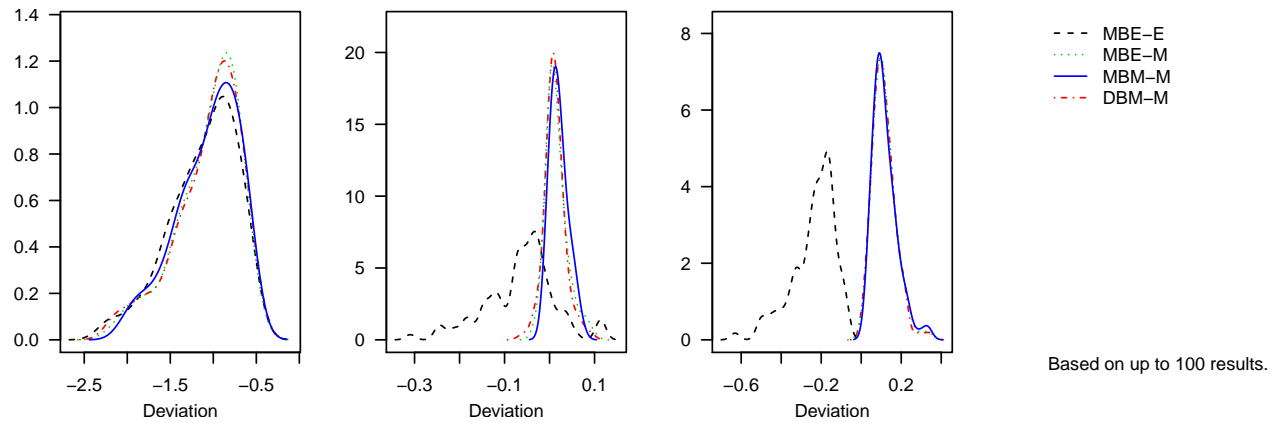


Table 48: RMSE

	alpha	sigma2	covariance
MBE-E	1.186	0.102	0.261
MBE-M	1.127	0.028	0.129
MBM-M	1.126	0.028	0.133
DBM-M	1.134	0.025	0.127

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	7903585	225470	69328	9915
MBE-M	897414	28618	6052	1216
MBM-M	260237	14078	3119	492
DBM-M	896342	54703	7219	1292

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.857	0.016	0.326	0.001
MBE-M	0.820	0.019	0.311	0.003
MBM-M	1.000	0.000	0.311	0.003
DBM-M	0.858	0.016	0.311	0.002

$m = 5$

mean of # of switching to Euler for MB_td_Milstein_pd_Milstein: 0

total # of negative proposals:

DBM_td_M_pd_M	MB_td_E_pd_E	MB_td_M_pd_E	MB_td_M_pd_M
0	0	0	0

The following sections show density plots of the discrepancy between the respective statistic of the samples from the approximated posteriors (sampled with two-step MCMC) and the sample from the true posterior (sampled with Stan) calculated for the 100 simulated datasets.

Posterior mean

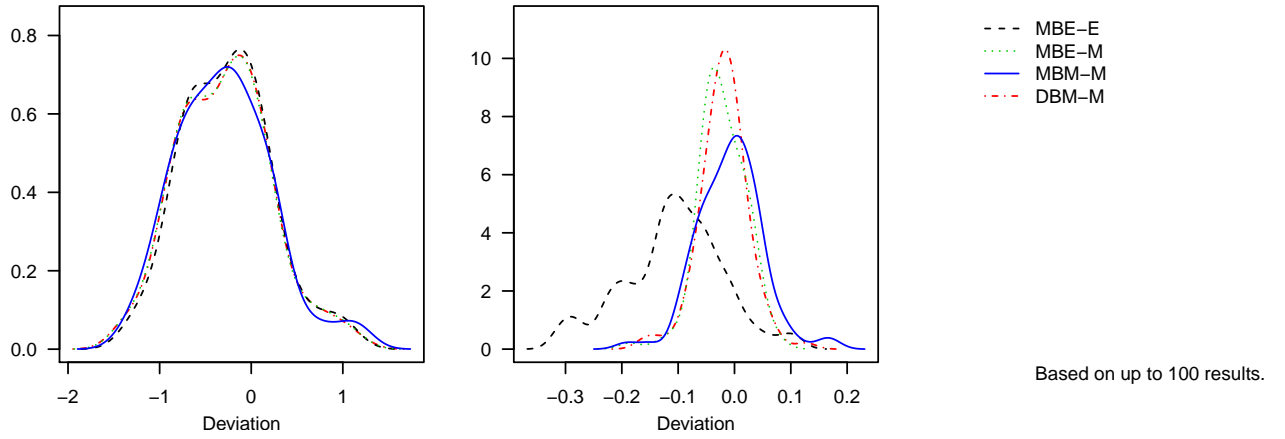


Table 52: RMSE

	alpha	sigma2
MBE-E	0.553	0.140
MBE-M	0.583	0.046
MBM-M	0.596	0.057
DBM-M	0.581	0.046

Posterior median

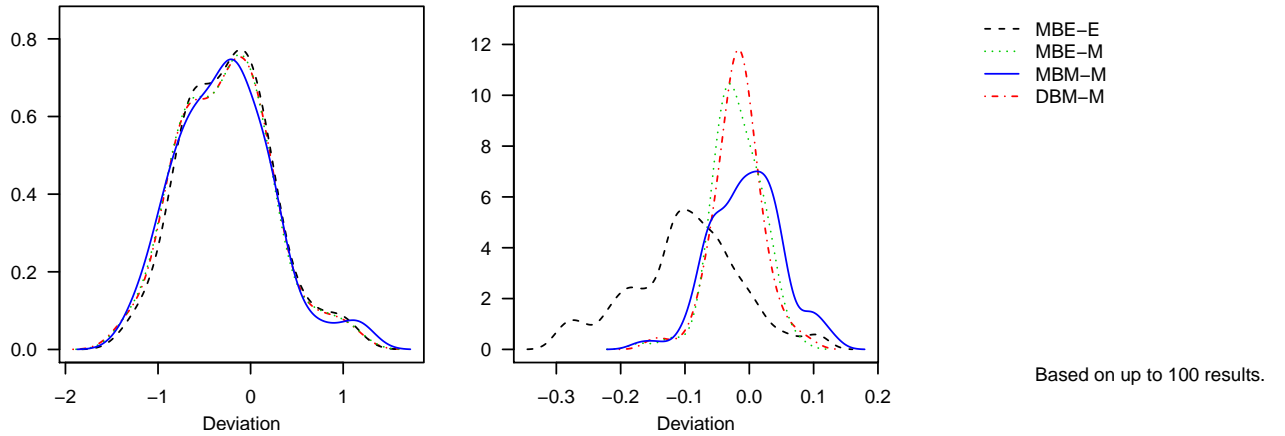


Table 53: RMSE

	alpha	sigma2
MBE-E	0.540	0.131
MBE-M	0.571	0.043
MBM-M	0.587	0.055
DBM-M	0.569	0.042

Posterior variance and covariance

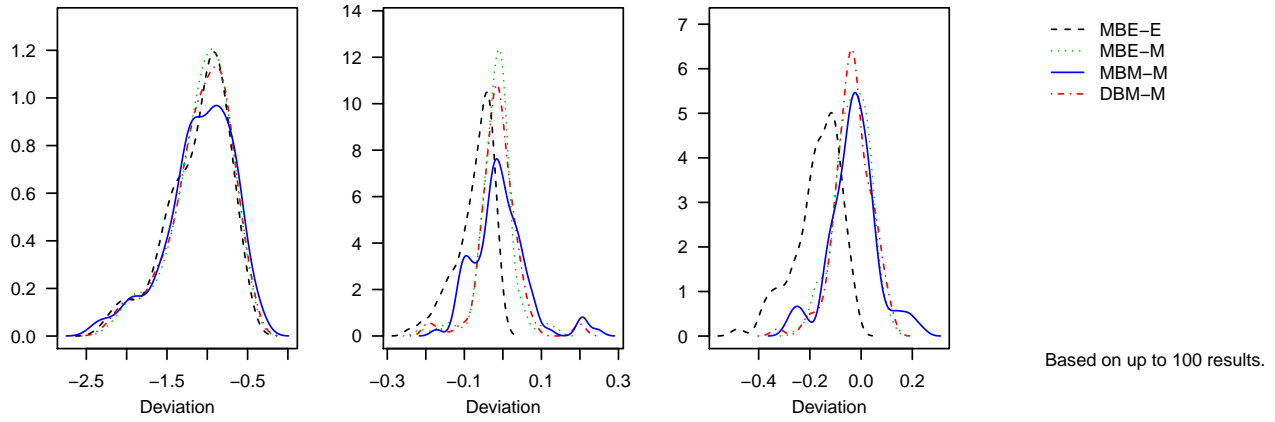


Table 54: RMSE

	alpha	sigma2	covariance
MBE-E	1.185	0.088	0.193
MBE-M	1.131	0.051	0.076
MBM-M	1.163	0.071	0.097
DBM-M	1.144	0.056	0.079

Number of iterations and effective sample size

	numIterations mean	numIterations sd	multivarESS mean	multivarESS sd
MBE-E	6158252	401004	18891	2137
MBE-M	410718	25139	1021	165
MBM-M	74907	6036	240	50
DBM-M	406680	26548	1117	192

Acceptance rates

	ARpath mean	ARpath sd	ARparam mean	ARparam sd
MBE-E	0.903	0.010	0.214	0.001
MBE-M	0.859	0.014	0.210	0.001
MBM-M	0.987	0.004	0.210	0.002
DBM-M	0.897	0.010	0.210	0.001

of missing results: 0

Stan results (sampling from and optimizing the true posterior)

M = 10

of missing results: 0

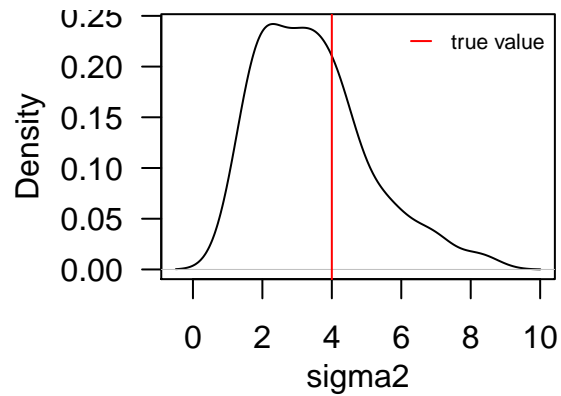
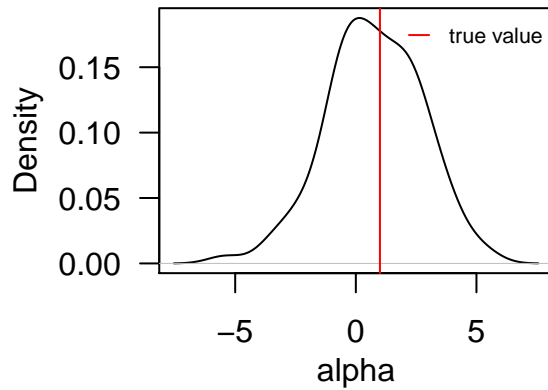
Rhat > 1.01: 0 (out of 200)

range of max. duration in seconds: (14.5, 19.8), median: 16.8

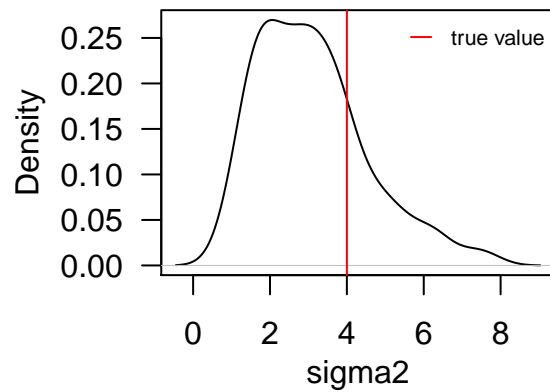
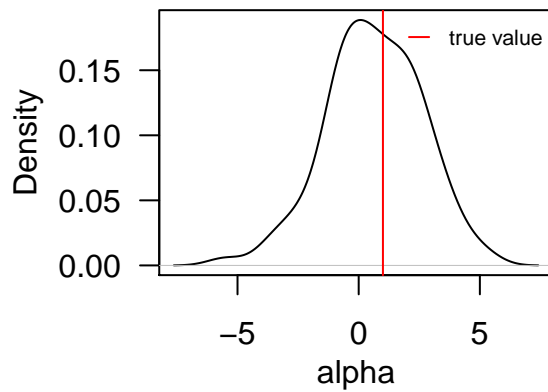
median multivarESS: 4.84426×10^5

The following sections show density plots of the respective statistic calculated for the 100 simulated datasets.

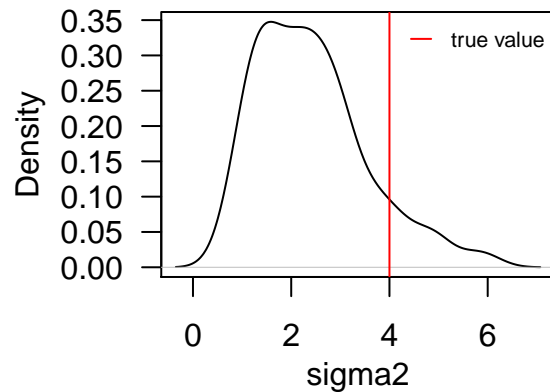
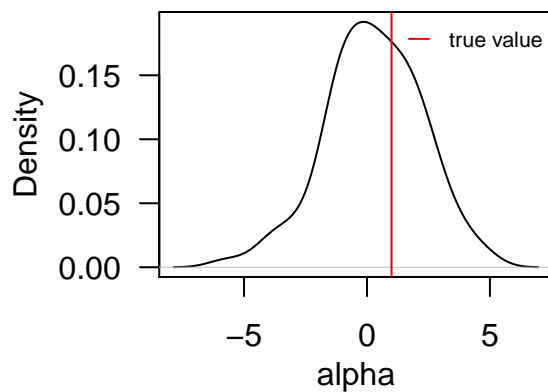
Posterior mean



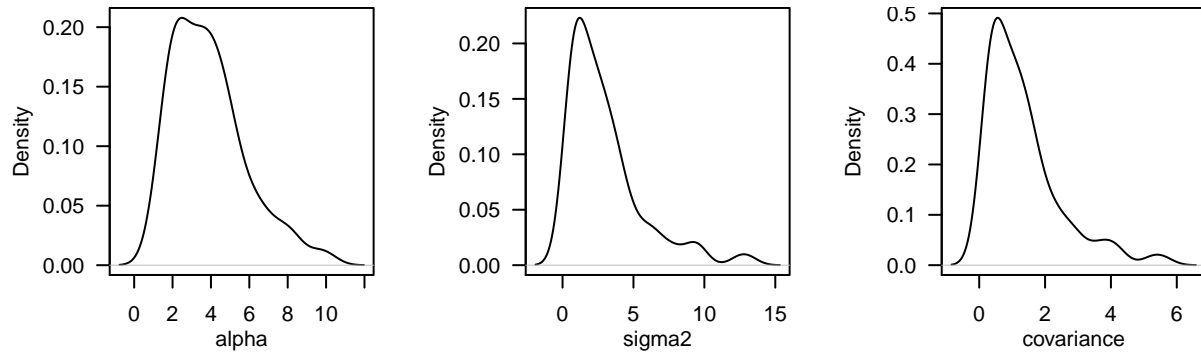
Posterior median



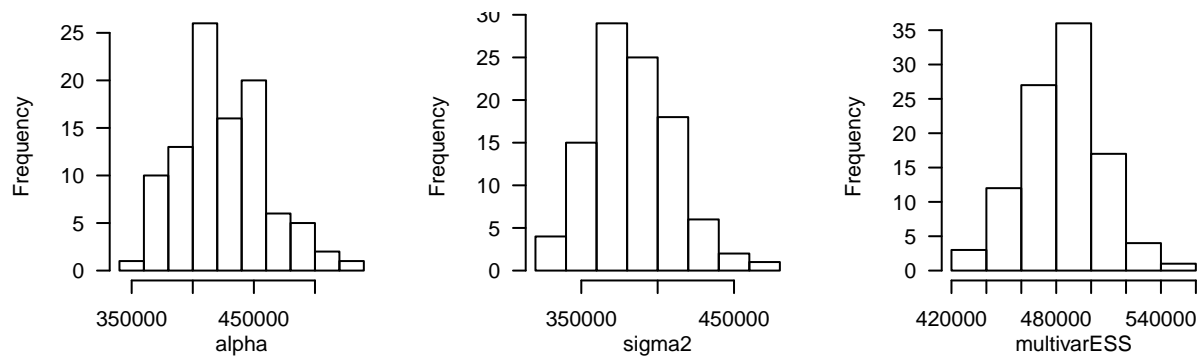
Optimized value



Posterior variance and covariance



Effective sample size



M = 20

of missing results: 0

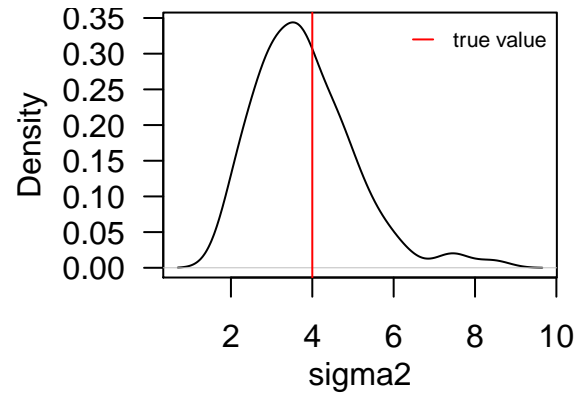
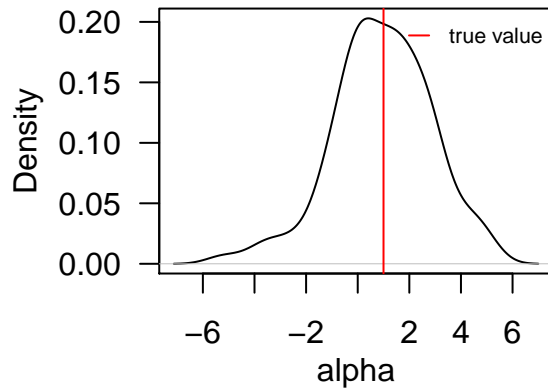
Rhat > 1.01: 0 (out of 200)

range of max. duration in seconds: (15.8, 20.6), median: 18

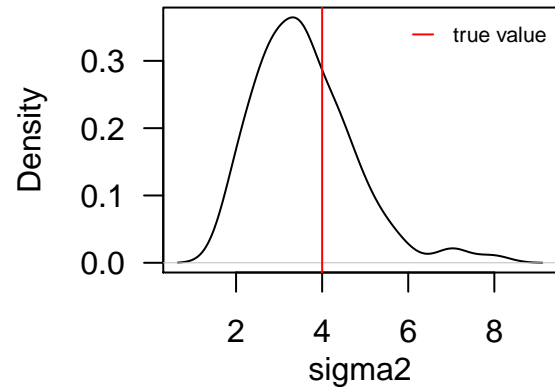
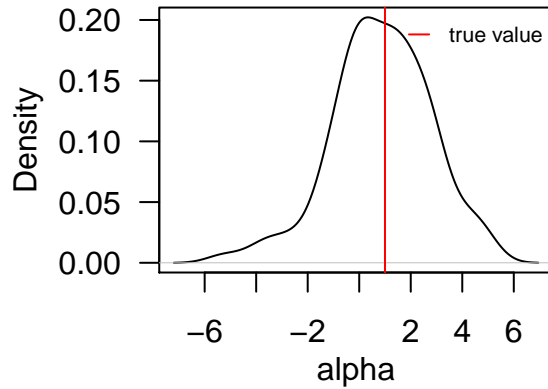
median multivarESS: 5.90399×10^5

The following sections show density plots of the respective statistic calculated for the 100 simulated datasets.

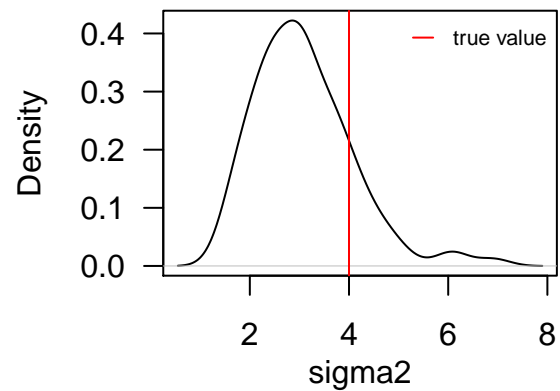
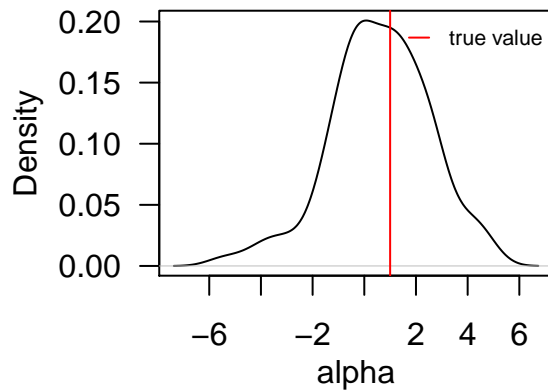
Posterior mean



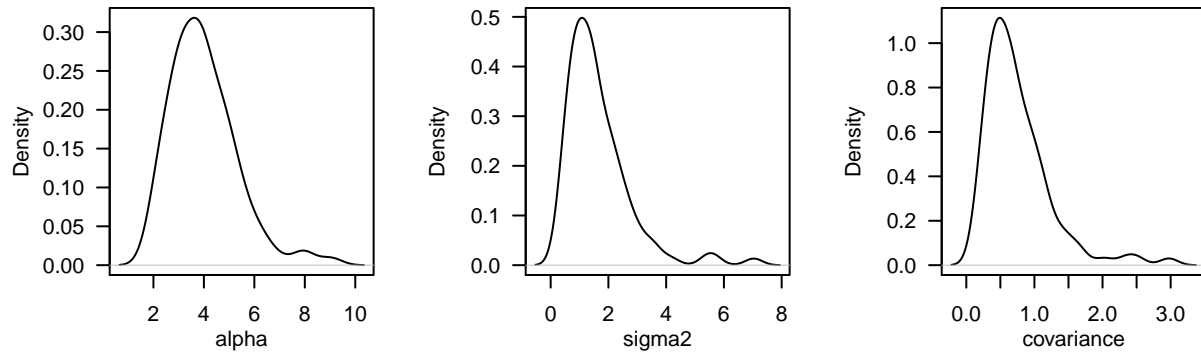
Posterior median



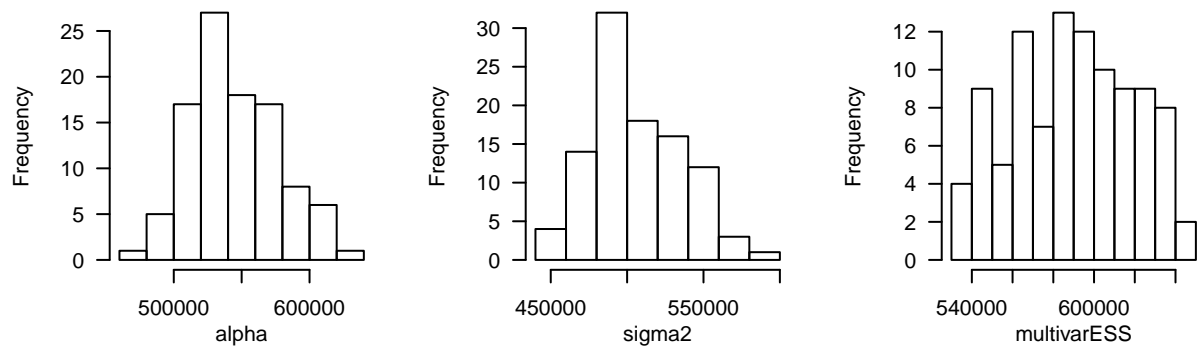
Optimized value



Posterior variance and covariance



Effective sample size



M = 50

of missing results: 0

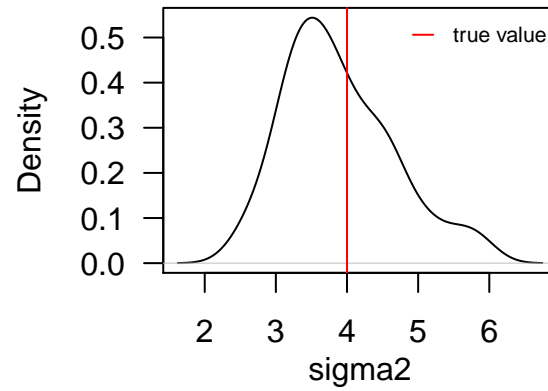
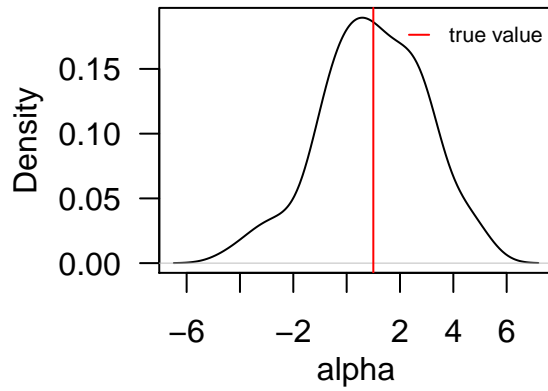
Rhat > 1.01: 0 (out of 200)

range of max. duration in seconds: (20, 26.5), median: 23

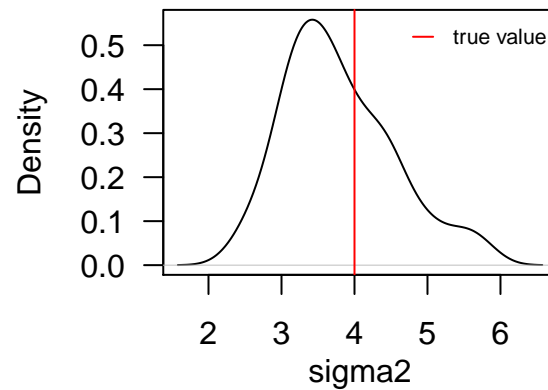
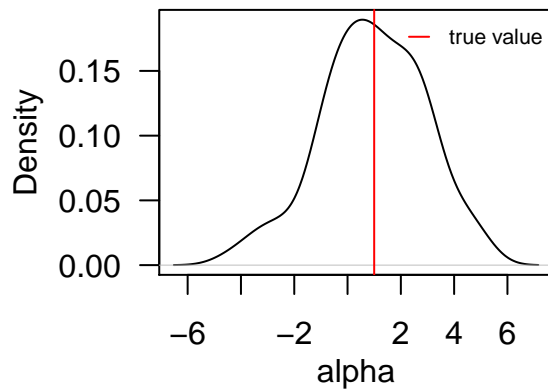
median multivarESS: 7.03998×10^5

The following sections show density plots of the respective statistic calculated for the 100 simulated datasets.

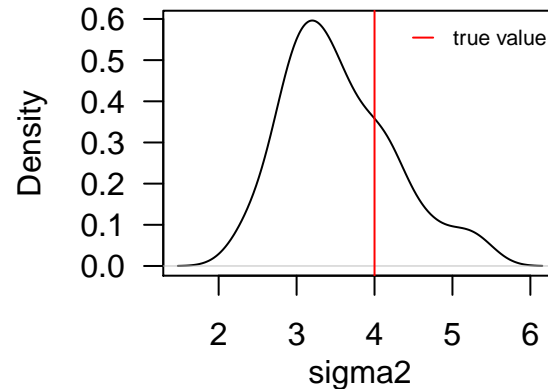
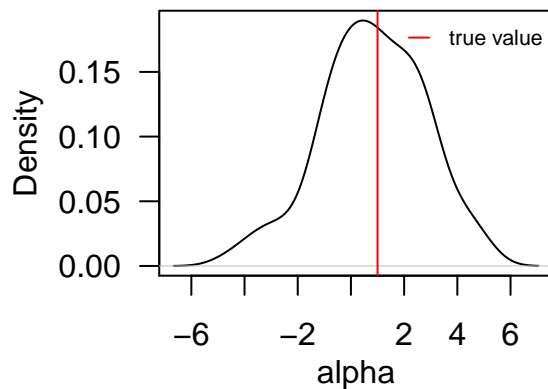
Posterior mean



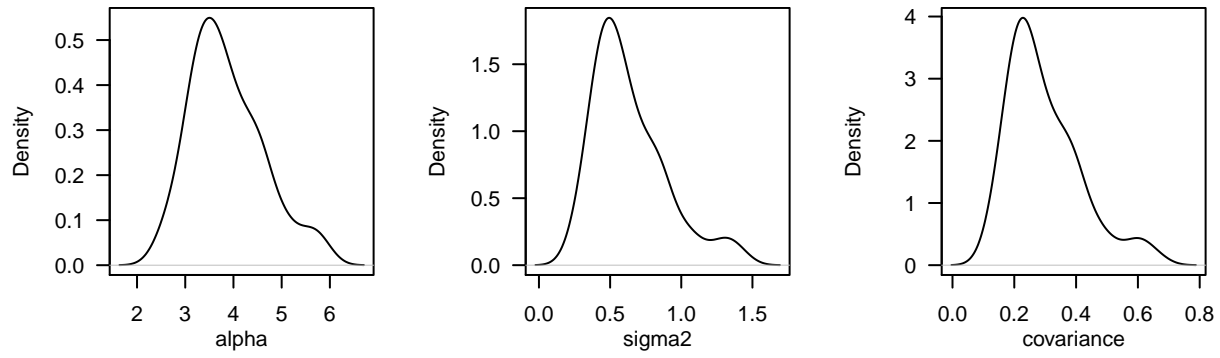
Posterior median



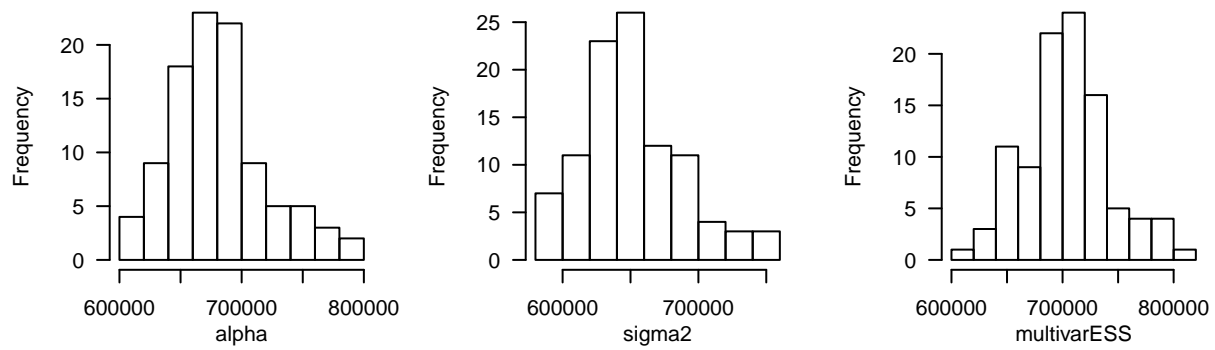
Optimized value



Posterior variance and covariance



Effective sample size



of missing Stan results: 0