## Versuch 1

> ########## ########## Vergleich der Simulationen in WinBUGS und STAN bei einfachen Modellen ########## ##########

> ########## Test mit Stan und Normalverteilung ##########

>

>

>

> ##### Clear data

> rm(list=ls())

>

>

>

> #### Setting working directory

> setwd("C:/Users/IvanB/Desktop/Masterarbeit/Ergebnisse/zusätzliche Experimente/Vergleich der Simulationen bei einfachen Modellen")

>

>

>

> #### Requiering stan

> library("rstan")

> library("rstantools")

> rstan\_options(auto\_write = TRUE)

> options(mc.cores = parallel::detectCores(1))

> Sys.setenv(LOCAL\_CPPFLAGS = '-march=native')

>

>

>

> #Data

> l=1

> m=1

> n=1

> o=1

> p=1

> q=1

> data\_list= list(l=l, m=m, n=n, o=o, p=p, q=q)

>

> # Initialwerte

> inits1 <- list(a=0, b=0, c=0, c=0, d=2, e=2, f=2, g=2, h=2, i=2, j=2, k=2, o=2, p=2, q=2 )

> inits2 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> inits3 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> #, l=1, m=2, n=2

>

> all.inits <- list(inits1, inits2, inits3)

> all.inits <- list(inits3)

>

>

> #data\_list <- list()

> m <- stan\_model('weitere Verteilungen.stan')

recompiling to avoid crashing R session

>

>

> # Simulation

> stan\_samples <- sampling(m, data=data\_list, init=all.inits,iter=30000, verbose=TRUE, chain=1, warmup= 15000, control = list(max\_treedepth = 12, adapt\_delta = 0.90))

CHECKING DATA AND PREPROCESSING FOR MODEL 'weitere Verteilungen' NOW.

COMPILING MODEL 'weitere Verteilungen' NOW.

STARTING SAMPLER FOR MODEL 'weitere Verteilungen' NOW.

SAMPLING FOR MODEL 'weitere Verteilungen' NOW (CHAIN 1).

Chain 1:

Chain 1: Gradient evaluation took 0 seconds

Chain 1: 1000 transitions using 10 leapfrog steps per transition would take 0 seconds.

Chain 1: Adjust your expectations accordingly!

Chain 1:

Chain 1:

Chain 1: Iteration: 1 / 30000 [ 0%] (Warmup)

Chain 1: Iteration: 3000 / 30000 [ 10%] (Warmup)

Chain 1: Iteration: 6000 / 30000 [ 20%] (Warmup)

Chain 1: Iteration: 9000 / 30000 [ 30%] (Warmup)

Chain 1: Iteration: 12000 / 30000 [ 40%] (Warmup)

Chain 1: Iteration: 15000 / 30000 [ 50%] (Warmup)

Chain 1: Iteration: 15001 / 30000 [ 50%] (Sampling)

Chain 1: Iteration: 18000 / 30000 [ 60%] (Sampling)

Chain 1: Iteration: 21000 / 30000 [ 70%] (Sampling)

Chain 1: Iteration: 24000 / 30000 [ 80%] (Sampling)

Chain 1: Iteration: 27000 / 30000 [ 90%] (Sampling)

Chain 1: Iteration: 30000 / 30000 [100%] (Sampling)

Chain 1:

Chain 1: Elapsed Time: 17.752 seconds (Warm-up)

Chain 1: 76.438 seconds (Sampling)

Chain 1: 94.19 seconds (Total)

Chain 1:

Warning messages:

1: There were 14076 divergent transitions after warmup. Increasing adapt\_delta above 0.9 may help. See

http://mc-stan.org/misc/warnings.html#divergent-transitions-after-warmup

2: Examine the pairs() plot to diagnose sampling problems

>

>

> #pairs(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "lp\_\_"), las = 1)

> # bringt kaum was

>

> Stan\_summary <- summary(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k", "o", "p", "q" ))$summary

Error in check\_pars(allpars, pars) : no parameter o, p, q

> Stan\_summary

Error: object 'Stan\_summary' not found

>

>

>

>

>

> ########## ########## Simulation beendet ########## ##########

> Stan\_summary <- summary(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k" ))$summary

> Stan\_summary

mean se\_mean sd 2.5% 25% 50% 75% 97.5% n\_eff Rhat

a 2.53893853 0.067029251 1.4480059 1.225158e-01 1.282270e+00 2.595661e+00 3.806086e+00 4.858944e+00 466.6722 1.0062604

b 0.48428052 0.013162925 0.2845434 2.448352e-02 2.416575e-01 4.728616e-01 7.248667e-01 9.735713e-01 467.2960 1.0016195

c 4.96315307 0.146817230 2.8508188 2.510883e-01 2.533088e+00 5.009815e+00 7.388913e+00 9.693065e+00 377.0380 1.0000342

d 1.45668051 0.268300617 32.6942236 1.524054e-298 1.002778e-211 3.975164e-131 2.206583e-59 5.301260e-04 14849.0515 1.0001145

e 8.57599999 0.902757830 87.4969332 1.006696e-162 2.997936e-60 1.498114e-28 6.897031e-11 3.224304e+01 9393.8395 1.0000386

f 107.92540659 5.845773892 343.1284415 1.758714e-17 7.812891e-04 4.895747e-01 3.134860e+01 1.101249e+03 3445.3188 1.0000945

g 0.16521826 0.031562662 3.7648786 7.730674e-301 1.683675e-219 7.216824e-143 4.480611e-65 2.927028e-05 14228.3562 0.9999656

h 0.02180499 0.003864127 0.4716073 2.780246e-292 5.642137e-208 6.053846e-124 1.119742e-57 1.736944e-05 14895.6087 0.9999917

i 1.16007467 0.104519926 11.1771756 7.531902e-155 3.248329e-58 3.479423e-28 3.257694e-11 5.922781e+00 11435.7845 0.9999615

j 1.05486355 0.057560972 3.1426416 3.878122e-19 3.024797e-06 6.214931e-03 4.125184e-01 1.061739e+01 2980.8044 1.0000064

k 1.00558517 0.046249671 1.0415091 2.071425e-02 2.711011e-01 6.714665e-01 1.400463e+00 3.902789e+00 507.1178 1.0003818

> # Error in check\_pars(allpars, pars) : no parameter o, p, q

## Versuch 2

> ########## ########## Vergleich der Simulationen in WinBUGS und STAN bei einfachen Modellen ########## ##########

> ########## Test mit Stan und Normalverteilung ##########

>

>

>

> ##### Clear data

> rm(list=ls())

>

>

>

> #### Setting working directory

> setwd("C:/Users/IvanB/Desktop/Masterarbeit/Ergebnisse/zusätzliche Experimente/Vergleich der Simulationen bei einfachen Modellen")

>

>

>

> #### Requiering stan

> library("rstan")

> library("rstantools")

> rstan\_options(auto\_write = TRUE)

> options(mc.cores = parallel::detectCores(1))

> Sys.setenv(LOCAL\_CPPFLAGS = '-march=native')

>

>

>

> #Data

> #l=1

> #m=1

> #n=1

> o=1

> p=1

> q=1

> data\_list= list( o=o, p=p, q=q)

>

> # Initialwerte

> inits1 <- list(a=0, b=0, c=0, c=0, d=2, e=2, f=2, g=2, h=2, i=2, j=2, k=2, o=2, p=2, q=2 )

> inits2 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> inits3 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> #, l=1, m=2, n=2

>

> all.inits <- list(inits1, inits2, inits3)

> all.inits <- list(inits3)

>

>

> #data\_list <- list()

> m <- stan\_model('weitere Verteilungen.stan')

hash mismatch so recompiling; make sure Stan code ends with a blank line

>

>

> # Simulation

> stan\_samples <- sampling(m, data=data\_list, init=all.inits,iter=30000, verbose=TRUE, chain=1, warmup= 15000, control = list(max\_treedepth = 12, adapt\_delta = 0.90))

CHECKING DATA AND PREPROCESSING FOR MODEL 'weitere Verteilungen' NOW.

COMPILING MODEL 'weitere Verteilungen' NOW.

STARTING SAMPLER FOR MODEL 'weitere Verteilungen' NOW.

SAMPLING FOR MODEL 'weitere Verteilungen' NOW (CHAIN 1).

Chain 1:

Chain 1: Gradient evaluation took 0 seconds

Chain 1: 1000 transitions using 10 leapfrog steps per transition would take 0 seconds.

Chain 1: Adjust your expectations accordingly!

Chain 1:

Chain 1:

Chain 1: Iteration: 1 / 30000 [ 0%] (Warmup)

Chain 1: Iteration: 3000 / 30000 [ 10%] (Warmup)

Chain 1: Iteration: 6000 / 30000 [ 20%] (Warmup)

Chain 1: Iteration: 9000 / 30000 [ 30%] (Warmup)

Chain 1: Iteration: 12000 / 30000 [ 40%] (Warmup)

Chain 1: Iteration: 15000 / 30000 [ 50%] (Warmup)

Chain 1: Iteration: 15001 / 30000 [ 50%] (Sampling)

Chain 1: Iteration: 18000 / 30000 [ 60%] (Sampling)

Chain 1: Iteration: 21000 / 30000 [ 70%] (Sampling)

Chain 1: Iteration: 24000 / 30000 [ 80%] (Sampling)

Chain 1: Iteration: 27000 / 30000 [ 90%] (Sampling)

Chain 1: Iteration: 30000 / 30000 [100%] (Sampling)

Chain 1:

Chain 1: Elapsed Time: 18.617 seconds (Warm-up)

Chain 1: 10.067 seconds (Sampling)

Chain 1: 28.684 seconds (Total)

Chain 1:

Warning messages:

1: There were 13108 divergent transitions after warmup. Increasing adapt\_delta above 0.9 may help. See

http://mc-stan.org/misc/warnings.html#divergent-transitions-after-warmup

2: Examine the pairs() plot to diagnose sampling problems

>

>

> #pairs(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "lp\_\_"), las = 1)

> # bringt kaum was

>

> Stan\_summary <- summary(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k" ))$summary

> Stan\_summary

mean se\_mean sd 2.5% 25% 50% 75% 97.5% n\_eff Rhat

a 2.49320947 0.069543165 1.4237039 1.588515e-01 1.289118e+00 2.447363e+00 3.714202e+00 4.881443e+00 419.1124 1.0000632

b 0.53765399 0.014818986 0.2877427 4.081991e-02 2.899852e-01 5.523288e-01 7.906719e-01 9.826159e-01 377.0263 1.0009695

c 4.86800139 0.164703894 2.9022303 2.377062e-01 2.300741e+00 4.791861e+00 7.439269e+00 9.722625e+00 310.4960 1.0007403

d 2.60250714 0.893815913 49.1615426 3.359296e-297 9.945173e-212 8.228968e-132 8.959881e-58 4.714119e-03 3025.2052 0.9999917

e 11.11735995 0.973013456 101.7004736 1.288498e-150 7.285060e-62 3.317630e-28 1.309025e-10 5.634734e+01 10924.6683 0.9999333

f 95.68268506 5.115055331 283.1787879 2.030594e-11 5.391114e-04 5.393043e-01 3.380477e+01 9.476586e+02 3064.9314 1.0023911

g 0.21980271 0.092846683 5.1939061 1.377233e-294 4.861594e-201 8.162789e-117 2.382718e-59 8.006267e-05 3129.3592 1.0000780

h 0.01481441 0.003077592 0.3095671 1.699869e-298 1.587089e-209 2.110904e-131 1.583235e-64 2.083635e-06 10117.8329 0.9999759

i 1.05082720 0.097960427 9.8462193 3.412631e-156 4.610566e-57 6.205275e-28 2.880897e-10 5.259998e+00 10102.7050 0.9999476

j 0.96866798 0.058408961 3.2242438 8.144166e-16 3.941192e-06 5.195731e-03 2.638534e-01 1.003297e+01 3047.1708 1.0005525

k 1.03534609 0.036200392 1.0632522 2.918226e-02 2.967201e-01 7.006915e-01 1.415289e+00 3.975332e+00 862.6727 1.0005326

> # Error in check\_pars(allpars, pars) : no parameter o, p, q

>

>

>

>

> ########## ########## Simulation beendet ########## ##########

## Versuch 3

> ########## ########## Vergleich der Simulationen in WinBUGS und STAN bei einfachen Modellen ########## ##########

> ########## Test mit Stan und Normalverteilung ##########

>

>

>

> ##### Clear data

> rm(list=ls())

>

>

>

> #### Setting working directory

> setwd("C:/Users/IvanB/Desktop/Masterarbeit/Ergebnisse/zusätzliche Experimente/Vergleich der Simulationen bei einfachen Modellen")

>

>

>

> #### Requiering stan

> library("rstan")

> library("rstantools")

> rstan\_options(auto\_write = TRUE)

> options(mc.cores = parallel::detectCores(1))

> Sys.setenv(LOCAL\_CPPFLAGS = '-march=native')

>

>

>

> #Data

> #l=1

> #m=1

> #n=1

> o=1

> p=1

> q=1

> data\_list= list( o=o, p=p, q=q)

>

> # Initialwerte

> inits1 <- list(a=0, b=0, c=0, c=0, d=2, e=2, f=2, g=2, h=2, i=2, j=2, k=2, o=2, p=2, q=2 )

> inits2 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> inits3 <- list(a=1, b=1, c=1, c=1, d=1, e=1, f=1, g=1, h=1, i=1, j=1, k=1, o=1, p=1, q=1 )

> #, l=1, m=2, n=2

>

> all.inits <- list(inits1, inits2, inits3)

> all.inits <- list(inits3)

>

>

> #data\_list <- list()

> m <- stan\_model('weitere Verteilungen.stan')

recompiling to avoid crashing R session

>

>

> # Simulation

> stan\_samples <- sampling(m, data=data\_list, init=all.inits,iter=30000, verbose=TRUE, chain=1, warmup= 15000, control = list(max\_treedepth = 12, adapt\_delta = 0.90))

CHECKING DATA AND PREPROCESSING FOR MODEL 'weitere Verteilungen' NOW.

COMPILING MODEL 'weitere Verteilungen' NOW.

STARTING SAMPLER FOR MODEL 'weitere Verteilungen' NOW.

SAMPLING FOR MODEL 'weitere Verteilungen' NOW (CHAIN 1).

Chain 1:

Chain 1: Gradient evaluation took 0 seconds

Chain 1: 1000 transitions using 10 leapfrog steps per transition would take 0 seconds.

Chain 1: Adjust your expectations accordingly!

Chain 1:

Chain 1:

Chain 1: Iteration: 1 / 30000 [ 0%] (Warmup)

Chain 1: Iteration: 3000 / 30000 [ 10%] (Warmup)

Chain 1: Iteration: 6000 / 30000 [ 20%] (Warmup)

Chain 1: Iteration: 9000 / 30000 [ 30%] (Warmup)

Chain 1: Iteration: 12000 / 30000 [ 40%] (Warmup)

Chain 1: Iteration: 15000 / 30000 [ 50%] (Warmup)

Chain 1: Iteration: 15001 / 30000 [ 50%] (Sampling)

Chain 1: Iteration: 18000 / 30000 [ 60%] (Sampling)

Chain 1: Iteration: 21000 / 30000 [ 70%] (Sampling)

Chain 1: Iteration: 24000 / 30000 [ 80%] (Sampling)

Chain 1: Iteration: 27000 / 30000 [ 90%] (Sampling)

Chain 1: Iteration: 30000 / 30000 [100%] (Sampling)

Chain 1:

Chain 1: Elapsed Time: 17.525 seconds (Warm-up)

Chain 1: 6.421 seconds (Sampling)

Chain 1: 23.946 seconds (Total)

Chain 1:

Warning messages:

1: There were 12982 divergent transitions after warmup. Increasing adapt\_delta above 0.9 may help. See

http://mc-stan.org/misc/warnings.html#divergent-transitions-after-warmup

2: Examine the pairs() plot to diagnose sampling problems

>

>

> #pairs(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "lp\_\_"), las = 1)

> # bringt kaum was

>

> Stan\_summary <- summary(stan\_samples, pars = c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k" ))$summary

> Stan\_summary

mean se\_mean sd 2.5% 25% 50% 75% 97.5% n\_eff Rhat

a 2.33704274 0.092700676 1.4558929 6.399017e-02 1.100189e+00 2.266454e+00 3.594836e+00 4.846560e+00 246.6568 1.0008565

b 0.50353367 0.017801465 0.2916066 2.859346e-02 2.516936e-01 4.977572e-01 7.586270e-01 9.802224e-01 268.3387 1.0047698

c 4.93364700 0.176405833 2.8667914 2.424200e-01 2.396530e+00 4.962149e+00 7.408253e+00 9.688284e+00 264.0987 1.0035169

d 1.01818595 0.298834896 23.3571628 2.679561e-296 3.092247e-218 5.089782e-141 9.550309e-66 7.944851e-05 6109.1045 1.0003252

e 7.84622769 0.797377894 73.4610029 2.083547e-159 7.540471e-59 9.719636e-29 4.859034e-11 3.845320e+01 8487.6082 0.9999415

f 103.95777772 6.563528736 321.8866215 1.782138e-13 6.619996e-04 7.038770e-01 3.769093e+01 1.058633e+03 2405.0886 1.0009454

g 0.11143375 0.023202136 2.2810002 1.298453e-292 4.227637e-200 1.516474e-119 6.792047e-55 1.977387e-04 9664.8413 0.9999407

h 0.01113783 0.002336124 0.2123394 3.167174e-296 3.778990e-196 2.501177e-118 8.980640e-57 1.132812e-05 8261.7021 1.0000111

i 1.15432623 0.126884002 10.9319228 1.598873e-130 2.669467e-53 1.068967e-27 8.277987e-11 5.214488e+00 7422.9986 1.0003735

j 0.88642311 0.049712252 2.9773410 4.601108e-17 1.014645e-06 2.561345e-03 2.498227e-01 8.879021e+00 3586.9909 0.9999336

k 1.03014622 0.037283496 1.0845308 2.907326e-02 2.863556e-01 6.749361e-01 1.409030e+00 3.963806e+00 846.1561 1.0005888

> # Error in check\_pars(allpars, pars) : no parameter o, p, q

>

>

>

>

> ########## ########## Simulation beendet ########## ##########