

# speedtest

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## Setup

```
library(dynamichazard); library(microbenchmark)

## Loading required package: survival

sim_func <- function(n, p){
  func <- asNamespace("dynamichazard")$test_sim_func_logit
  set.seed(101)
  t_max <- 30L
  func(n_series = n, n_vars = p, t_max = t_max, x_range = 1, x_mean = 0,
       beta_start = runif(p, -1.5, 1.5),
       intercept_start = -3, sds = c(.1, rep(.25, p)),
       tstart_sampl_func = function(t0, t_max)
         max(0, runif(1, -t_max, t_max - 1L)),
       lambda = 1 / 10)
}

get_rune_time_summary <- function(n, p){
  sims <- sim_func(n, p)

  out <- summary(microbenchmark(
    EKF_one_correction_step =
      suppressMessages(ddhazard(
        formula = Surv(tstart, tstop, event) ~ . - id,
        data = sims$res,
        model = "logit",
        id = sims$res$id,
        by = 1L,
        max_T = 30L,
        Q_0 = diag(1e6, p + 1L),
        Q = diag(1e-1, p + 1L))),
    EKF_more_correction_step =
      suppressMessages(ddhazard(
        formula = Surv(tstart, tstop, event) ~ . - id,
        data = sims$res,
        model = "logit",
        id = sims$res$id,
        by = 1L,
        max_T = 30L,
        Q_0 = diag(1, p + 1L),
        Q = diag(1e-1, p + 1L),
        control = list(NR_eps = 1e-3))),
    SMA = suppressMessages(ddhazard(
```

```

    formula = Surv(tstart, tstop, event) ~ . - id,
    data = sims$res,
    model = "logit",
    id = sims$res$id,
    by = 1L,
    max_T = 30L,
    Q_0 = diag(1e6, p + 1L),
    Q = diag(1e-1, p + 1L),
    control = list(method = "SMA"))),

  GMA = suppressMessages(ddhazard(
    formula = Surv(tstart, tstop, event) ~ . - id,
    data = sims$res,
    model = "logit",
    id = sims$res$id,
    by = 1L,
    max_T = 30L,
    Q_0 = diag(1, p + 1L),
    Q = diag(1e-1, p + 1L),
    control = list(method = "GMA"))),

  UKF = suppressMessages(ddhazard(
    formula = Surv(tstart, tstop, event) ~ . - id,
    data = sims$res,
    model = "logit",
    id = sims$res$id,
    by = 1L,
    max_T = 30L,
    Q_0 = diag(1, p + 1L),
    Q = diag(1e-1, p + 1L),
    control = list(method = "UKF"))),

  times = 5
))

cat("(n, p) = (", n, ", ", p, ")",
    ". Units is ", sQuote(attr(out, "unit")), "\n", sep = "")

print(out[, c("expr", "lq", "median", "uq")], row.names = FALSE)

cat("\n\n")

invisible()
}

```

## Test

```

grid_vals <- expand.grid(
  n = c(250, 1000, 10000),
  p = c(5, 10, 15))

```

```
invisible(
  mapply(get_rune_time_summary, n = grid_vals$n, p = grid_vals$p))
```

```
## (n, p) = (250, 5). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 69   69.1  77.3
## EKF_more_correction_step 118  119.8 123.0
##           SMA 177  189.8 190.9
##           GMA 193  194.2 194.4
##           UKF 287  292.6 294.1
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 220   222 225
## EKF_more_correction_step 559   561 566
##           SMA 530   536 536
##           GMA 281   282 283
##           UKF 509   513 520
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 429   506 524
## EKF_more_correction_step 1067  1075 1080
##           SMA 2111  2212 2223
##           GMA 972   975 983
##           UKF 2478  2495 2518
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 120   124 127
## EKF_more_correction_step 253   258 260
##           SMA 422   438 453
##           GMA 368   372 383
##           UKF 890   891 898
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 143   145 148
## EKF_more_correction_step 305   311 320
##           SMA 511   525 525
##           GMA 227   228 232
##           UKF 802   803 806
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##           expr  lq median  uq
## EKF_one_correction_step 587   592 595
## EKF_more_correction_step 1038  1130 1138
##           SMA 3010  3097 3102
##           GMA 1165  1179 1184
```

```

##          UKF 3860   3932 3971
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##      expr   lq median   uq
## EKF_one_correction_step 296   300 302
## EKF_more_correction_step 336   338 341
##      SMA  918   966 976
##      GMA  429   438 450
##      UKF 2132  2133 2142
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##      expr   lq median   uq
## EKF_one_correction_step 216   226 232
## EKF_more_correction_step 443   450 464
##      SMA  997  1082 1121
##      GMA  363   370 371
##      UKF 1538  1539 1542
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##      expr   lq median   uq
## EKF_one_correction_step 460   569 571
## EKF_more_correction_step 1111  1127 1134
##      SMA 4117  4126 4127
##      GMA 1226  1280 1293
##      UKF 5165  5217 5238

```

## Session info

- R version 3.4.2 (2017-09-28), x86\_64-w64-mingw32
- Locale: LC\_COLLATE=English\_United States.1252, LC\_CTYPE=C, LC\_MONETARY=English\_United States.1252, LC\_NUMERIC=C, LC\_TIME=English\_United States.1252
- Running under: Windows 10 x64 (build 16299)
- Matrix products: default
- Base packages: base, datasets, graphics, grDevices, methods, stats, utils
- Other packages: dynamichazard 0.5.1, microbenchmark 1.4-2.1, survival 2.41-3
- Loaded via a namespace (and not attached): backports 1.1.0, boot 1.3-20, codetools 0.2-15, colorspace 1.3-2, compiler 3.4.2, data.table 1.10.4-2, digest 0.6.12, evaluate 0.10.1, ggplot2 2.2.1, grid 3.4.2, gtable 0.2.0, htmltools 0.3.6, knitr 1.17, lattice 0.20-35, lazyeval 0.2.0, magrittr 1.5, MASS 7.3-47, Matrix 1.2-11, multcomp 1.4-7, munsell 0.4.3, mvtnorm 1.0-6, parallel 3.4.2, plyr 1.8.4, Rcpp 0.12.13, rlang 0.1.4, rmarkdown 1.6, rprojroot 1.2, sandwich 2.4-0, scales 0.5.0, splines 3.4.2, stringi 1.1.5, stringr 1.2.0, TH.data 1.0-8, tibble 1.3.4, tools 3.4.2, yaml 2.1.14, zoo 1.8-0