

# 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", "cld")], 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 cld
## EKF_one_correction_step 16.5   18.9 21.5  a
## EKF_more_correction_step 36.3   37.5 38.3  a
##      SMA 77.1   83.5 86.0  a
##      GMA 28.5   31.3 33.1  a
##      UKF 71.2   74.3 80.1  a
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 29.3   30.9 33.4  a
## EKF_more_correction_step 43.6   44.3 47.0 ab
##      SMA 52.8   52.9 68.9  b
##      GMA 42.5   45.8 46.4 ab
##      UKF 100.7  105.6 112.8  c
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 163    246 248  a
## EKF_more_correction_step 319    325 416  b
##      SMA 456    546 558  c
##      GMA 194    219 281  a
##      UKF 550    619 625  c
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 46.5   46.6 50.1  a
## EKF_more_correction_step 74.5   79.1 84.8  b
##      SMA 121.0  133.7 135.3  c
##      GMA 61.2   61.4 62.2  a
##      UKF 317.6  322.5 323.5  d
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 33.8   34.8 36.4  a
## EKF_more_correction_step 51.5   55.1 56.2  b
##      SMA 97.5   103.8 116.6  c
##      GMA 43.0   48.9 51.3  ab
##      UKF 204.9  205.2 207.0  d
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 299    307 317  a
## EKF_more_correction_step 393    404 496  b
##      SMA 724    727 732  c
##      GMA 362    363 364  a
```

```

##          UKF 1010   1017 1041    d
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step  91.9   95.9 104.3 a
## EKF_more_correction_step  80.5   81.6  82.8 a
##          SMA 174.3  178.2 182.9  b
##          GMA  77.2   77.8  87.0  a
##          UKF 422.9  436.6 437.6   c
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step   82   83.5  87.3 a
## EKF_more_correction_step 153  157.9 160.3 b
##          SMA 316  385.0 386.4   c
##          GMA 115  116.9 123.3 ab
##          UKF 497  499.0 506.8   d
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step  256   336  338 a
## EKF_more_correction_step 474   550  551 c
##          SMA 909   981  991   d
##          GMA 352   452  453  b
##          UKF 1802  1812 1846   e

```

## Session info

- R version 3.4.1 (2017-06-30), x86\_64-w64-mingw32
- Locale: LC\_COLLATE=English\_United Kingdom.1252, LC\_CTYPE=English\_United Kingdom.1252, LC\_MONETARY=English\_United Kingdom.1252, LC\_NUMERIC=C, LC\_TIME=English\_United Kingdom.1252
- Running under: Windows 10 x64 (build 15063)
- Matrix products: default
- Base packages: base, datasets, graphics, grDevices, methods, stats, utils
- Other packages: dynamichazard 0.3.5, microbenchmark 1.4-2.1, survival 2.41-3
- Loaded via a namespace (and not attached): backports 1.1.0, boot 1.3-19, codetools 0.2-15, colorspace 1.3-2, compiler 3.4.1, data.table 1.10.4, digest 0.6.12, evaluate 0.10, ggplot2 2.2.1, grid 3.4.1, gtable 0.2.0, htmltools 0.3.6, knitr 1.16, lattice 0.20-35, lazyeval 0.2.0, magrittr 1.5, MASS 7.3-47, Matrix 1.2-10, multcomp 1.4-6, munsell 0.4.3, mvtnorm 1.0-6, plyr 1.8.4, Rcpp 0.12.12, rlang 0.1.1, rmarkdown 1.5, rprojroot 1.2, sandwich 2.3-4, scales 0.4.1, speedglm 0.3-2, splines 3.4.1, stringi 1.1.5, stringr 1.2.0, TH.data 1.0-8, tibble 1.3.3, tools 3.4.1, yaml 2.1.14, zoo 1.8-0