

# 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 19.9   20.9 21.4  a
## EKF_more_correction_step 34.3   36.8 39.8  a
##      SMA 75.9   87.7 90.9  a
##      GMA 26.1   27.0 31.0  a
##      UKF 72.9   73.1 76.2  a
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 32.1   33.5 36.2  a
## EKF_more_correction_step 44.3   45.3 47.3  b
##      SMA 54.9   56.9 58.7  c
##      GMA 37.4   39.1 41.0  a
##      UKF 101.6  105.6 106.5  d
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 244     245 249  a
## EKF_more_correction_step 407     419 424  b
##      SMA 476     582 586  c
##      GMA 237     239 248  a
##      UKF 564     591 662  c
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 45.6   45.9 50.8  a
## EKF_more_correction_step 79.8   81.4 84.5  b
##      SMA 136.2  138.1 147.1  c
##      GMA 58.6   59.5 61.5  a
##      UKF 334.0  335.1 340.0  d
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 37.8   40.3 41.5  a
## EKF_more_correction_step 61.8   63.0 64.1  b
##      SMA 105.9  106.8 107.0  c
##      GMA 45.1   48.3 51.3  a
##      UKF 205.1  206.5 206.7  d
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 217     308 315  a
## EKF_more_correction_step 378     386 394  b
##      SMA 683     757 758  c
##      GMA 289     313 380 ab
```

```

##          UKF 952    990 1026    d
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 102.9  108.3 110.9  b
## EKF_more_correction_step 92.2   93.0 96.6   b
##          SMA 181.3  181.4 182.7   c
##          GMA 64.0   69.4 73.4   a
##          UKF 441.1  450.0 452.7   d
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 84.1    91  91.4  a
## EKF_more_correction_step 172.1   172 182.4  b
##          SMA 336.4   367 414.1   c
##          GMA 112.3   113 115.2  a
##          UKF 529.8   530 531.1   d
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 262    338 365  a
## EKF_more_correction_step 582    582 591   c
##          SMA 1018   1019 1027   d
##          GMA 459    475 477   b
##          UKF 1860   1961 1963   e

```

## Session info

- R version 3.4.0 (2017-04-21), 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 0.3.2, 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 3.4.0, data.table 1.10.4, digest 0.6.12, evaluate 0.10, ggplot2 2.2.1, grid 3.4.0, 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 1.2-9, multcomp 1.4-6, munsell 0.4.3, mvtnorm 1.0-6, plyr 1.8.4, Rcpp 0.12.11, rlang 0.1.1, rmarkdown 1.5, rprojroot 1.2, sandwich 2.3-4, scales 0.4.1, speedglm 0.3-2, splines 3.4.0, stringi 1.1.5, stringr 1.2.0, TH.data 1.0-8, tibble 1.3.3, tools 3.4.0, yaml 2.1.14, zoo 1.8-0