

# 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  59.3   60.4  70.9
## EKF_more_correction_step 114.6  119.2 119.6
##           SMA 179.1  187.5 198.8
##           GMA 174.1  175.2 176.0
##           UKF 259.7  261.1 295.4
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##           expr    lq median    uq
## EKF_one_correction_step  181    182 186
## EKF_more_correction_step  523    524 537
##           SMA  558    559 571
##           GMA  254    257 257
##           UKF  465    472 473
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##           expr    lq median    uq
## EKF_one_correction_step  360    362 364
## EKF_more_correction_step  881    890 900
##           SMA 2278   2392 4158
##           GMA  783    815 837
##           UKF 2229   2257 2288
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##           expr    lq median    uq
## EKF_one_correction_step  101    106 107
## EKF_more_correction_step  228    230 231
##           SMA  439    439 444
##           GMA  337    341 342
##           UKF  811    812 828
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##           expr    lq median    uq
## EKF_one_correction_step  136    137 139
## EKF_more_correction_step  301    303 306
##           SMA  478    489 527
##           GMA  189    190 197
##           UKF  701    702 703
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##           expr    lq median    uq
## EKF_one_correction_step  461    515 524
## EKF_more_correction_step  904    923 945
##           SMA 2879   2892 3131
##           GMA  932    974 996
```

```

##           UKF 3471   3503 3535
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##           expr   lq median   uq
##   EKF_one_correction_step 259   262 263
##   EKF_more_correction_step 294   296 299
##           SMA  878   1046 1147
##           GMA  387   387 388
##           UKF 1836   1838 1843
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##           expr   lq median   uq
##   EKF_one_correction_step 205   206 206
##   EKF_more_correction_step 443   444 444
##           SMA  876   979 998
##           GMA  293   294 297
##           UKF 1292   1292 1320
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##           expr   lq median   uq
##   EKF_one_correction_step 410   412 473
##   EKF_more_correction_step 878   940 958
##           SMA 3631   3680 3824
##           GMA  961   973 986
##           UKF 4295   4301 4374

```

## Session info

- R version 3.5.0 (2018-04-23), 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 17134)
- Matrix products: default
- Base packages: base, datasets, graphics, grDevices, methods, stats, utils
- Other packages: dynamichazard 0.5.2, microbenchmark 1.4-4, survival 2.41-3
- Loaded via a namespace (and not attached): backports 1.1.2, boot 1.3-20, compiler 3.5.0, digest 0.6.15, evaluate 0.10.1, grid 3.5.0, htmltools 0.3.6, knitr 1.20, lattice 0.20-35, magrittr 1.5, Matrix 1.2-14, parallel 3.5.0, Rcpp 0.12.16, rmarkdown 1.9, rprojroot 1.3-2, splines 3.5.0, stringi 1.1.7, stringr 1.3.0, tools 3.5.0, yaml 2.1.18