# speedtest

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## Setup

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

```
## Loading required package: survival
```

```r
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))
```

```r
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  63.7   65.6  69.2
##  EKF_more_correction_step 104.4  113.0 117.6
##                       SMA 174.3  177.2 177.6
##                       GMA 154.7  157.6 158.3
##                       UKF 202.0  202.2 210.2
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 191    193 212
##  EKF_more_correction_step 539    541 560
##                       SMA 506    514 528
##                       GMA 263    267 268
##                       UKF 428    441 441
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  514    521  525
##  EKF_more_correction_step 1015   1030 1037
##                       SMA 2109   2114 2183
##                       GMA  581    651  670
##                       UKF 2275   2309 2372
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 116    121 122
##  EKF_more_correction_step 235    237 244
##                       SMA 408    412 418
##                       GMA 314    317 317
##                       UKF 554    566 580
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 137    157 158
##  EKF_more_correction_step 315    323 341
##                       SMA 504    506 557
##                       GMA 220    220 223
##                       UKF 641    646 664
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  473    580  580
##  EKF_more_correction_step 1064   1072 1125
##                       SMA 3010   3018 3034
##                       GMA  790    795  804
```

```
##                              UKF 3420    3429 3474
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##                        expr   lq median   uq
##    EKF_one_correction_step  297     298  309
##  EKF_more_correction_step  331     335  341
##                         SMA  923     990  990
##                         GMA  419     421  429
##                         UKF 1267    1319 1350
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##                        expr   lq median   uq
##    EKF_one_correction_step  240     240  242
##  EKF_more_correction_step  476     480  482
##                         SMA 1012    1090 1102
##                         GMA  362     368  369
##                         UKF 1129    1133 1136
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##                        expr   lq median   uq
##    EKF_one_correction_step  456     561  563
##  EKF_more_correction_step 1000    1083 1097
##                         SMA 4225    4226 4281
##                         GMA  794     825  876
##                         UKF 4583    4644 4666
```

# Session info

- R version 3.4.1 (2017-06-30), `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 15063)`

- Matrix products: default

- Base packages: base, datasets, graphics, grDevices, methods, stats, utils

- Other packages: dynamichazard 0.5.0, 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 1.10.4-2, digest 0.6.12, evaluate 0.10.1, ggplot2 2.2.1, grid 3.4.1, 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 1.2-10, multcomp 1.4-7, munsell 0.4.3, mvtnorm 1.0-6, parallel 3.4.1, plyr 1.8.4, Rcpp 0.12.13, rlang 0.1.2, rmarkdown 1.6, rprojroot 1.2, sandwich 2.4-0, scales 0.5.0, splines 3.4.1, stringi 1.1.5, stringr 1.2.0, TH.data 1.0-8, tibble 1.3.4, tools 3.4.1, yaml 2.1.14, zoo 1.8-0