# speedtest

*Benjamin Christoffersen*

*2017-09-14*

## 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  62.1   62.6  67.9
##  EKF_more_correction_step 118.5  123.7 130.0
##                        SMA 162.1  162.4 167.8
##                        GMA 168.3  168.9 171.1
##                        UKF 182.1  182.8 185.6
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##                        expr  lq median  uq
##    EKF_one_correction_step 182    193 202
##  EKF_more_correction_step 529    530 532
##                        SMA 447    464 465
##                        GMA 300    306 307
##                        UKF 378    381 381
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##                        expr   lq median   uq
##    EKF_one_correction_step  368    448  472
##  EKF_more_correction_step  918    948  994
##                        SMA 1914   1978 2034
##                        GMA  608    690  696
##                        UKF 1882   1944 1973
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##                        expr  lq median  uq
##    EKF_one_correction_step 115    118 119
##  EKF_more_correction_step 252    252 255
##                        SMA 370    387 394
##                        GMA 324    327 327
##                        UKF 498    500 501
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##                        expr  lq median  uq
##    EKF_one_correction_step 153    154 156
##  EKF_more_correction_step 326    329 331
##                        SMA 446    457 463
##                        GMA 234    236 240
##                        UKF 539    540 544
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##                        expr   lq median   uq
##    EKF_one_correction_step  457    459  461
##  EKF_more_correction_step  901    974 1014
##                        SMA 2587   2683 2691
##                        GMA  809    818  824
```

```
##                               UKF  2928    2962 3004
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##                       expr    lq median   uq
##   EKF_one_correction_step  289     309   329
##  EKF_more_correction_step  355     366   374
##                        SMA  872     891   902
##                        GMA  442     451   459
##                        UKF 1029    1030 1152
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##                       expr    lq median   uq
##   EKF_one_correction_step  229     235   235
##  EKF_more_correction_step  467     471   474
##                        SMA  894     969 1021
##                        GMA  361     375   378
##                        UKF  967     982   987
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##                       expr    lq median   uq
##   EKF_one_correction_step  426     443   508
##  EKF_more_correction_step  969     970   995
##                        SMA 3748    3929 3951
##                        GMA  816     822   861
##                        UKF 3978    4021 4045
```

# 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 10586)`

- Matrix products: default

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

- Other packages: dynamichazard 0.4.0, microbenchmark 1.4-2.1, survival 2.41-3

- Loaded via a namespace (and not attached): backports 1.1.0, boot 1.3-19, colorspace 1.3-2, compiler 3.4.1, data.table 1.10.4, 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, Matrix 1.2-10, munsell 0.4.3, plyr 1.8.4, Rcpp 0.12.12, rlang 0.1.2, rmarkdown 1.6, rprojroot 1.2, scales 0.5.0, splines 3.4.1, stringi 1.1.5, stringr 1.2.0, tibble 1.3.4, tools 3.4.1, yaml 2.1.14