

# 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 18.8   20.5 21.2  a
## EKF_more_correction_step 34.3   34.6 37.1  a
##      SMA 75.7   82.7 97.2  a
##      GMA 28.0   28.1 28.1  a
##      UKF 75.0   77.6 78.0  a
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 30.4   32.1 32.4  a
## EKF_more_correction_step 48.2   48.3 48.3  c
##      SMA 57.0   57.5 63.6  d
##      GMA 37.4   42.1 42.2  b
##      UKF 102.6  105.0 108.8  e
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 244    253 260  a
## EKF_more_correction_step 409    425 427  b
##      SMA 485    581 581  c
##      GMA 237    249 252  a
##      UKF 577    591 678  c
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 42.3   43.9 48.8  a
## EKF_more_correction_step 77.3   80.0 83.1  b
##      SMA 131.7  136.4 144.8  c
##      GMA 54.6   54.8 58.0  a
##      UKF 332.4  333.4 339.1  d
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 39.4   40.5 41.6  a
## EKF_more_correction_step 66.1   69.3 71.0  b
##      SMA 103.4  106.5 108.9  c
##      GMA 44.9   46.3 48.6  a
##      UKF 205.7  207.0 208.0  d
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##      expr    lq median    uq cld
## EKF_one_correction_step 233    319 321  a
## EKF_more_correction_step 404    413 438  b
##      SMA 679    761 765  c
##      GMA 289    308 380 ab
```

```

##          UKF 948    972 1043    d
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 104.7  107.9 111.6  b
## EKF_more_correction_step 96.2   99.9 101.9  b
##          SMA 178.1  185.4 185.7   c
##          GMA 65.1   65.5 67.8  a
##          UKF 444.7  450.1 450.6    d
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 85.6   86.8 92.8  a
## EKF_more_correction_step 167.1  169.6 170.4  b
##          SMA 341.3  370.3 415.6   c
##          GMA 111.5  112.6 114.9  a
##          UKF 523.8  525.8 526.5    d
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##          expr    lq median    uq  cld
## EKF_one_correction_step 351     358 358  a
## EKF_more_correction_step 597     610 614   c
##          SMA 940     966 1030   d
##          GMA 454     458 469   b
##          UKF 1968    1981 1988    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