

# 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 = .25, x_mean = 0,
       beta_start = runif(p, -1.5, 1.5),
       intercept_start = -4, sds = c(.1, rep(.25, p)),
       tstart_sampl_func = function(t0, t_max)
         max(0, runif(1, -t_max, t_max - 1L)))
}

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 33.9  40.9  43.5  a
## EKF_more_correction_step 60.3  62.3  67.0  a
##      SMA 42.2  45.1  47.2  a
##      GMA 42.7  43.6  46.6  a
##      UKF 183.0 183.7 185.0  a
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step 72.1  73.5  74.9  a
## EKF_more_correction_step 117.5 119.5 144.0  b
##      SMA 126.1 130.9 136.7  b
##      GMA 91.1  92.7  98.7  ab
##      UKF 327.4 330.5 339.8  c
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step 748    756  774  a
## EKF_more_correction_step 939    983 1066  b
##      SMA 1784   1821 1841   d
##      GMA 870    915  921  ab
##      UKF 1471   1472 1476   c
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step 44.6  46.7  47.5  a
## EKF_more_correction_step 98.0 105.2 109.4  c
##      SMA 51.8  52.5  60.7  a
##      GMA 70.7  73.8  77.6  b
##      UKF 525.9 526.5 547.7  d
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step 74.5  74.9  85.5  a
## EKF_more_correction_step 169.2 172.3 173.6  b
##      SMA 155.3 156.6 158.6  b
##      GMA 123.2 123.3 125.6  b
##      UKF 469.7 470.9 472.5  c
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step 853    889  946  a
## EKF_more_correction_step 1162   1172 1216  a
##      SMA 4130   4166 4547   c
##      GMA 1145   1153 1157  a
##      UKF 3303   3338 3344  b
```

```
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##      expr      lq median      uq      cld
## EKF_one_correction_step 212.0  213.1 232.1    d
## EKF_more_correction_step 135.3  144.4 145.9    c
##      SMA  65.2   67.3  71.2 a
##      GMA  90.7   93.7 101.6 b
##      UKF 730.6  733.6 734.1    e
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##      expr      lq median      uq cld
## EKF_one_correction_step  293    294  299  a
## EKF_more_correction_step  266    272  275  a
##      SMA 1435   1451 1602  b
##      GMA  345    346  350  a
##      UKF  883    896  912  b
##
##
## (n, p) = (10000, 15). Units is 'seconds'
##      expr      lq median      uq cld
## EKF_one_correction_step  1.16    1.16  1.18  a
## EKF_more_correction_step  1.66    1.66  1.72  a
##      SMA  7.69    8.17  8.31  b
##      GMA  1.53    1.64  1.71  a
##      UKF  6.76    6.81  6.89  b
```

## 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 14393)
- Matrix products: default
- Base packages: base, datasets, graphics, grDevices, methods, stats, utils
- Other packages: dynamichazard 0.3.0, microbenchmark 1.4-2.1, survival 2.41-2
- Loaded via a namespace (and not attached): backports 1.0.5, 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, 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 1.3.0, tools 3.4.0, yaml 2.1.14, zoo 1.8-0