speedtest

Benjamin Christoffersen

2017-07-08

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))
```

```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 cld
##   EKF_one_correction_step 23.3   24.1  34.7   a
##  EKF_more_correction_step 33.8   44.5  54.8   a
##                       SMA 94.4   99.6 105.3   a
##                       GMA 38.7   41.3  52.5   a
##                       UKF 80.7   85.2  85.7   a
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##                       expr    lq median    uq  cld
##   EKF_one_correction_step  32.2   36.2  37.6 a
##  EKF_more_correction_step  49.9   52.9  54.2  b
##                       SMA  63.3   67.3  70.4   c
##                       GMA  48.2   48.7  57.4  b
##                       UKF 112.5  116.7 120.4    d
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##                       expr  lq median  uq cld
##   EKF_one_correction_step 216    252 275 a
##  EKF_more_correction_step 385    416 434  b
##                       SMA 647    655 662   c
##                       GMA 239    323 330 a
##                       UKF 719    764 765   c
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##                       expr    lq median    uq  cld
##   EKF_one_correction_step  41.1   41.6  43.8 a
##  EKF_more_correction_step  73.6   74.7  82.2  b
##                       SMA 141.6  153.1 157.8   c
##                       GMA  69.3   72.6  79.7  b
##                       UKF 339.6  348.5 361.1    d
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##                       expr    lq median    uq cld
##   EKF_one_correction_step  40.3   42.9  47.5 a
##  EKF_more_correction_step  56.0   58.7  59.3 a
##                       SMA 119.1  122.7 133.2  b
##                       GMA  48.0   53.3  56.3 a
##                       UKF 240.6  246.0 254.8   c
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##                       expr   lq median   uq  cld
##   EKF_one_correction_step  327    349  363 a
##  EKF_more_correction_step  428    488  526  b
##                       SMA  842    849  851   c
##                       GMA  405    411  411 ab
```

```
##                       UKF 1070   1094 1148    d
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##                      expr    lq median    uq cld
##   EKF_one_correction_step 102.7  103.5 104.7 a
##  EKF_more_correction_step  85.1   90.7 101.7 a
##                       SMA 183.2  189.6 195.7  b
##                       GMA  80.3   89.7  94.1 a
##                       UKF 484.0  487.3 490.0   c
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##                      expr    lq median    uq  cld
##   EKF_one_correction_step  84.7   89.9  90.8 a
##  EKF_more_correction_step 169.6  177.4 182.4  b
##                       SMA 411.1  435.9 441.5   c
##                       GMA 127.6  131.4 140.4 ab
##                       UKF 560.5  581.8 589.4    d
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##                      expr   lq median   uq  cld
##   EKF_one_correction_step  269    368  377 a
##  EKF_more_correction_step  489    597  623  b
##                       SMA  953   1002 1006   c
##                       GMA  379    439  469 ab
##                       UKF 2044   2057 2086    d
```

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 0.3.4, 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