speedtest

Benjamin Christoffersen

2017-11-20

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")], 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  59.6   60.3  64.7
##  EKF_more_correction_step 108.5  108.9 113.6
##                       SMA 174.9  175.6 176.0
##                       GMA 148.8  149.6 152.7
##                       UKF 263.0  268.6 271.0
##
##
## (n, p) = (1000, 5). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 183    191 192
##  EKF_more_correction_step 494    497 501
##                       SMA 482    484 484
##                       GMA 257    263 267
##                       UKF 473    475 478
##
##
## (n, p) = (10000, 5). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  500    510  514
##  EKF_more_correction_step 1018   1019 1023
##                       SMA 2178   2179 2180
##                       GMA  935    949 1018
##                       UKF 2446   2466 2536
##
##
## (n, p) = (250, 10). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 118    126 135
##  EKF_more_correction_step 257    269 289
##                       SMA 435    449 455
##                       GMA 353    356 357
##                       UKF 945    952 955
##
##
## (n, p) = (1000, 10). Units is 'milliseconds'
##                       expr  lq median  uq
##   EKF_one_correction_step 153    156 157
##  EKF_more_correction_step 308    311 325
##                       SMA 533    541 583
##                       GMA 233    238 250
##                       UKF 844    852 886
##
##
## (n, p) = (10000, 10). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  584    594  606
##  EKF_more_correction_step 1029   1099 1113
##                       SMA 3087   3187 3193
##                       GMA 1244   1316 1398
```

```
##                       UKF 3901   3948 3949
##
##
## (n, p) = (250, 15). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  335    345  348
##  EKF_more_correction_step  344    349  368
##                       SMA  890   1002 1044
##                       GMA  437    438  440
##                       UKF 2303   2322 2350
##
##
## (n, p) = (1000, 15). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  223    234  234
##  EKF_more_correction_step  458    475  525
##                       SMA 1049   1074 1212
##                       GMA  353    387  403
##                       UKF 1616   1628 1641
##
##
## (n, p) = (10000, 15). Units is 'milliseconds'
##                       expr   lq median   uq
##   EKF_one_correction_step  550    550  554
##  EKF_more_correction_step 1168   1222 1236
##                       SMA 4118   4307 4346
##                       GMA 1243   1312 1317
##                       UKF 5074   5278 5326
```

Session info

- R version 3.4.2 (2017-09-28), `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 1.3-20, codetools 0.2-15, colorspace 1.3-2, compiler 3.4.2, data.table 1.10.4-2, digest 0.6.12, evaluate 0.10.1, ggplot2 2.2.1, grid 3.4.2, 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 1.2-11, multcomp 1.4-7, munsell 0.4.3, mvtnorm 1.0-6, parallel 3.4.2, plyr 1.8.4, Rcpp 0.12.13, rlang 0.1.4, rmarkdown 1.6, rprojroot 1.2, sandwich 2.4-0, scales 0.5.0, splines 3.4.2, stringi 1.1.5, stringr 1.2.0, TH.data 1.0-8, tibble 1.3.4, tools 3.4.2, yaml 2.1.14, zoo 1.8-0