Simple 3-state Digitized Partitioned Survival model in R

The DARTH workgroup

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- Jalal H, Pechlivanoglou P, Krijkamp E, Alarid-Escudero F, Enns E, Hunink MG. An Overview of R in Health Decision Sciences. Med Decis Making. 2017; 37(3): 735-746. https://journals.sagepub.com/doi/abs/10.1177/0272989X16686559
- Krijkamp EM, Alarid-Escudero F, Enns EA, Jalal HJ, Hunink MGM, Pechlivanoglou P. Microsimulation modeling for health decision sciences using R: A tutorial. Med Decis Making. 2018;38(3):400–22. https://journals.sagepub.com/doi/abs/10.1177/0272989X18754513
- Krijkamp EM, Alarid-Escudero F, Enns E, Pechlivanoglou P, Hunink MM, Jalal H. A Multidimensional Array Representation of State-Transition Model Dynamics. BioRxiv 670612 2019.https://www.biorxiv.org/content/10.1101/670612v1

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Change `eval` to `TRUE` if you want to knit this document.

```
rm(list = ls())      # clear memory (removes all the variables from the workspace)
```

01 Load packages

```
if (!require('pacman')) install.packages('pacman'); library(pacman) # use this package to conveniently
# load (install if required) packages from CRAN
p_load("here", "dplyr", "devtools", "gems", "flexsurv", "survHE", "ggplot2", "msm", "igraph", "mstate",
       "reshape2", "knitr")
```

02 Load functions

```
source(here::here("functions", "functions.R"))
```

03 Input model parameters

```
v_n       <- c("healthy", "sick", "dead")  # state names
n_s       <- length(v_n)                   # No of states
c_l       <- 1 / 12                        # cycle length (a month)
n_t       <- 20                            # number of years (20 years)
times     <- seq(0, n_t, c_l)              # the cycles in years
d_r       <- 0.03                          # discount rate
set.seed(2009)                             # set the seed

c_H       <- 200                           # cost of remaining one cycle healthy
c_S       <- 500                           # cost of remaining one cycle sick
c_D       <- 0                             # cost of remaining one cycle dead
v_c       <- c(c_H, c_S, c_D)              # store in a vector

u_H       <- 0.75                          # utility when healthy
u_S       <- 0.30                          # utility when sick
u_D       <- 0                             # utility when dead
v_u       <- c(u_H, u_S, u_D)              # store in a vector

v_dw      <- 1 / (1 + d_r) ^ (times)       # discount weight
```

04 Digitized Data

Use the function `digitise()` to translate the digitised OS and PFS data into patient level information.

```r
# Create IPD and KM data for the OS curves
digitise(here::here("data","OS_Examp.txt"),
         here::here("data", "OS_Examp_AtRisk.txt"),
         nevent_inp = 52,
         km_output  = here::here("output", "KMdata_OS.txt"),
         ipd_output = here::here("output", "IPDdata_OS.txt"))

# Create IPD and KM data for the PFS curves
# your turn

# Link the IPD files across the two arms of the trial for OS and PFS
IPD_OS  <- make.ipd(ipd_files = c(here::here("output", "IPDdata_OS.txt")), ctr = 1,
                    var.labs  = c("time","event","arm"))
# repeat for PFS, your turn
```

05 Analysis

05.1 Partitioned Survival model

```r
# your turn
```

Calculate total cost and QALYs per cycle.

```r
# your turn
```