

# Package ‘AalenJohansen’

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**Type** Package

**Title** Conditional Aalen-Johansen Estimation

**Version** 1.0

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**Description** Provides the conditional Nelson-Aalen and Aalen-Johansen estimators. The methods are based on Bladt & Furrer (2023), in preparation.

**License** GPL (>= 2)

**Encoding** UTF-8

**RoxygenNote** 7.2.1

**Suggests** knitr, rmarkdown

**VignetteBuilder** knitr

**NeedsCompilation** no

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**Repository** CRAN

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aalen_johansen	<i>Compute the conditional Aalen-Johansen estimator.</i>
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**Description**

Compute the conditional Aalen-Johansen estimator.

**Usage**

```
aalen_johansen(
  data,
  x = NULL,
  a = NULL,
  p = NULL,
  alpha = 0.05,
  collapse = FALSE
)
```

**Arguments**

data	A list of trajectory data for each individual.
x	A numeric value for conditioning.
a	A bandwidth. Default uses an asymmetric version using alpha.
p	An integer representing the number of states. The absorbing state is last.
alpha	A probability around the point x, for asymmetric sub-sampling.
collapse	Logical, whether to collapse the last state of the model.

**Value**

A list containing the Aalen-Johansen estimator, the Nelson-Aalen estimator, and related quantities.

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prodint	<i>Calculate the product integral of a matrix function</i>
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**Description**

Calculate the product integral of a matrix function

**Usage**

```
prodint(start, end, step_size, lambda)
```

**Arguments**

start	Start time.
end	End time.
step_size	Step size of the grid.
lambda	A given matrix function.

**Value**

The product integral of the given matrix function.

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sim_path	<i>Simulate the path of a time-inhomogeneous (semi-)Markov process until a maximal time</i>
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**Description**

Simulate the path of a time-inhomogeneous (semi-)Markov process until a maximal time

**Usage**

```
sim_path(i, rates, dists, t = 0, u = 0, tn = Inf, abs = numeric(0), bs = NA)
```

**Arguments**

i	The initial state, integer.
rates	The total transition rates out of states, a function with arguments state (integer), time (numeric), and duration (numeric) returning a rate (numeric).
dists	The distribution of marks, a function with arguments state (integer), time (numeric), and duration (numeric) returning a probability vector.
t	The initial time, numeric.
u	The initial duration (since the last transition), numeric. By default equal to zero
tn	The maximal time, numeric. By default equal to infinity
abs	Vector indicating which states are absorbing. By default the last state is absorbing.
bs	Vector of upper bounds on the total transition rates. By default the bounds are determined using optimize, which might only identify a local maximum.

**Value**

A list concerning jump times and states, with the first time being the initial time t and state and the last time being tn (if not absorbed)

**Examples**

```
jump_rate <- function(i, t, u){if(i == 1){3*t} else if(i == 2){5*t} else{0}}
mark_dist <- function(i, s, v){if(i == 1){c(0, 1/3, 2/3)} else if(i == 2){c(1/5, 0, 4/5)} else{0}}
sim <- sim_path(sample(1:2, 1), t = 0, tn = 2, rates = jump_rate, dists = mark_dist)
sim
```

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