1 Motivation

Originally motivated by spedygiorgio's `lifecon.sty`, this package mimics its behavior for existing commands and extends it to a certain extent.

2 Inherited from `lifecon`

The following commands are provided for backward compatibility:

```
\lcroof{n}
\lcterm{a}{x}{n}
\lctermadj{a}{x}{n}
\lcend{a}{x}{n}
\lcfirst{a}{x}{y},  \lcfirst[u]{a}{x}{y}
\lcsecond{a}{x}{y}, \lcsecond[u]{a}{x}{y}
\lccomptwo{a}{x}{y}{z}
\lccompthree{a}{x}{y}{z}{w}
\surstat{a}{x}{n}
\defsurstat{a}{x}{n}
\anndue{x}{n}, \anncon{x}{n}, \annimm{x}{n}
\termins{x}{n},  \insend{x}{n},  \pureend{x}{n}
\terminsc{x}{n}, \insendc{x}{n}, \pureendc{x}{n}
```

Styling of `\lcroof` has been replaced with that of `\actuarialangle`, since the former is subscripted, unlike the latter.

Command	Old Rendering	New Rendering
`\lcroof{n}i`	$\overline{n}\!i$	$\overline{n}\rfloor i$

The following have been unchanged:

Command	Old Rendering	New Rendering
`\lcterm{a}{x}{n}`	$a^{1}_{x:\overline{n}\rfloor}$	$a^{1}_{x:\overline{n}\rfloor}$
`\lctermadj{a}{x}{n}`	$a^{A}_{x:\overline{n}\rfloor}$	$a^{A}_{x:\overline{n}\rfloor}$
`\lcend{a}{x}{n}`	$a_{x:\overline{n}\rfloor}^{1}$	$a_{x:\overline{n}\rfloor}^{1}$
`\lcfirst{a}{x}{y}`	a^{1}_{xy}	a^{1}_{xy}
`\lcsecond{a}{x}{y}`	a_{xy}^{2}	a_{xy}^{2}
`\lccomptwo{a}{x}{y}{z}`	$\underset{1}{a^{2}_{xyz}}$	$\underset{1}{a^{2}_{xyz}}$
`\lccompthree{a}{x}{y}{z}{w}`	$\underset{12}{a^{3}_{xyzw}}$	$\underset{12}{a^{3}_{xyzw}}$

The following commands have a slight change in styling:

Command	Old Rendering	New Rendering
`\surstat{a}{x}{n}`	$\frac{a}{x_1x_2\ldots x_n}$	$\frac{a}{x_1x_2\ldots x_n}$
`\defsurstat{a}{x}{n}`	$\frac{[a]}{x_1x_2\ldots x_n}$	$\frac{[a]}{x_1x_2\ldots x_n}$

Some common life annuity / insurance types:

Description	Command	Old Rendering	New Rendering
Annuity due	`\anndue{x}{n}`	$\ddot{a}_{x:\overline{n}\vert}$	$\ddot{a}_{x:\overline{n}\vert}$
Annuity immediate	`\annimm{x}{n}`	$a_{x:\overline{n}\vert}$	$a_{x:\overline{n}\vert}$
Continuous annuity	`\anncon{x}{n}`	$\bar{a}_{x:\overline{n}\vert}$	$\overline{a}_{x:\overline{n}\vert}$
Discreet term insurance	`\termins{x}{n}`	$A^{1}_{x:\overline{n}\vert}$	$A^{1}_{x:\overline{n}\vert}$
Discreet endowment	`\insend{x}{n}`	$A_{x:\overline{n}\vert}$	$A_{x:\overline{n}\vert}$
Discreet pure endowment	`\pureend{x}{n}`	$A_{x:\overline{n}\vert}^{1}$	$A_{x:\overline{n}\vert}^{1}$
Continuous term insurance	`\terminsc{x}{n}`	$\bar{A}^{1}_{x:\overline{n}\vert}$	$\overline{A}^{1}_{x:\overline{n}\vert}$
Continuous endowment	`\insendc{x}{n}`	$\bar{A}_{x:\overline{n}\vert}$	$\overline{A}_{x:\overline{n}\vert}$
Continuous pure endowment	`\pureendc{x}{n}`	${}_{n}E_{x}$	$\overline{A}_{x:\overline{n}\vert}^{1}$

Note the change in notation for pure endowment from ${}_{n}E_{x}$ to $\overline{A}_{x:\overline{n}\vert}^{1}$.

3 In spirit of `lifecon`

The following commands have been added with naming inspired by `lifecon`:

New Command	Inspired By	Rendering
`\lcdue{b}{x}{n}`	`\anndue{x}{n}`	$\ddot{b}_{x:\overline{n}\vert}$
`\lcimm{b}{x}{n}`	`\annimm{x}{n}`	$b_{x:\overline{n}\vert}$
`\lccon{b}{x}{n}`	`\anncon{x}{n}`	$\overline{b}_{x:\overline{n}\vert}$
	`\lcterm{b}{x}{n}`	$b^{1}_{x:\overline{n}\vert}$
	`\lctermadj{b}{x}{n}`	$b^{A}_{x:\overline{n}\vert}$
	`\lcend{b}{x}{n}`	$b_{x:\overline{n}\vert}^{1}$
`\lc{w}{x}{t}`		${}_{t}w_{x}$
`\lcp{x}{t}`		${}_{t}p_{x}$
`\lcq{x}{t}`		${}_{t}q_{x}$
`\lcpterm{x}{n}{t}`		${}_{t}p_{x:\overline{n}\vert}$
`\lcqterm{x}{n}{t}`		${}_{t}q_{x:\overline{n}\vert}$
`\accomplete{w}`		$\overset{\circ}{w}$
`\acdefer{w}{m}{k}`		${}_{m\vert k}w$
`\lcelife{x}`	Complete life expectancy	$\overset{\circ}{e}_{x}$
`\lcelifeterm{x}{n}`		$\overset{\circ}{e}_{x:\overline{n}\vert}$
`\lcecurt{x}`	Curtate life expectancy	e_{x}
`\lcecurtterm{x}{n}`		$e_{x:\overline{n}\vert}$

4 Cashflows

To create cashflow figures, use the `cf` command:

```
\cf{length}{}{node pairs}{arrow pairs}
```

or, if you want to specify scale (default is 1.5),

```
\cf[scale]{length}{}{node pairs}{arrow pairs}
```

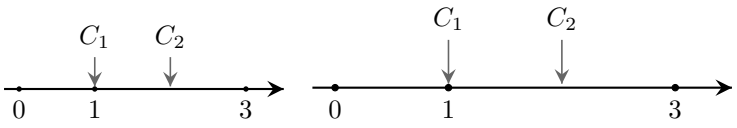
The node (arrow) pairs should be of the form

$$x_1/\ell_1, \cdots, x_n/\ell_n$$

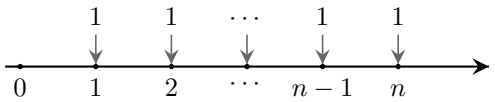
where $x_1, \cdots, x_n$ are the x-coordinates of the nodes (arrows), and $\ell_1, \cdots, \ell_n$ are the corresponding labels.

For example, the following is the result of

```
\cf[1]{3.5}{0/$0$, 1/$1$, 3/$3$}{1/$C_1$, 2/$C_2$}
 \cf{3.5}{0/$0$, 1/$1$, 3/$3$}{1/$C_1$, 2/$C_2$}
```



Another example is $a_{\overline{n}|i}$, the present value of the following cashflow:



and $\ddot{a}_{\overline{n}|i}$, the present value of the following cashflow: