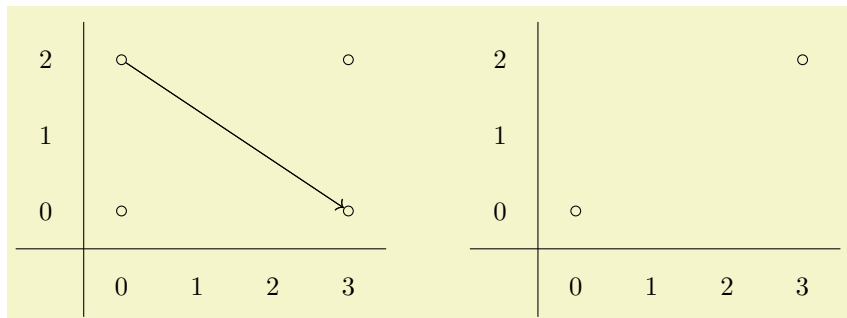


1 Introduction

The `sseqpages` package consists of two main environments – the `sseqdata` environment, which specifies the data for a named spectral sequence diagram, and the `sseqpage` environment, which prints a single page of a spectral sequence diagram. The command `\printpage` is also available as a synonym for a `sseqpage` environment with an empty body.

Here is a basic example:



```
\begin{sseqdata}[name=ex1,cohomological Serre grading]
\class(0,0)
\class(0,2)
\class(3,0)
\class(3,2)
\d3(0,2)
\end{sseqdata}
\printpage[name=ex1,page=3]\hskip1cm
\printpage[name=ex1,page=4]
```

`\begin{sseqdata}[name=ex1,degree={#1}{1-#1}]` starts the declaration of the data of a spectral sequence named `ex1` whose page r differentials go r to the right and down $r - 1$ (this is cohomological Serre grading). Then we specify four classes and one page 3 differential, and we ask `sseqpages` to print the third and fourth pages of the spectral sequence. Note that on the fourth page, the source and target of the differential have disappeared.

2 The main commands

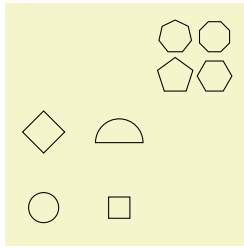
`\class[options](coordinate)`

This places a class at $\langle coordinate \rangle = (\langle xcoord \rangle, \langle ycoord \rangle)$ where $\langle xcoord \rangle$ and $\langle ycoord \rangle$ are integers. If multiple classes occur at the same position, `sseqpages` will automatically arrange them in a pre-specified pattern:

```
\begin{sseqpage}[no axes,ymirror]
\class(0,0)
\class(1,0)\class(1,0)
\class(0,1)\class(0,1)\class(0,1)
\class(1,1)\class(1,1)\class(1,1)\class(1,1)
\class(0,2)\class(0,2)\class(0,2)\class(0,2)\class(0,2)
\class(1,2)\class(1,2)\class(1,2)\class(1,2)\class(1,2)\class(1,2)
\end{sseqpage}
```

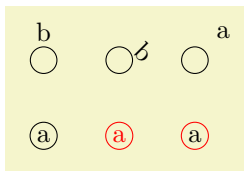
The effect of the `\class` command is to print a `TikZ` node. Any option that would work for a `TikZ` `\node` command will also work in the same way for the `\class`, `\replaceclass`, and `\classoptions` commands. For instance:

- The name of a `TikZ` node shape. The standard `TikZ` shapes are `circle` and `rectangle`, but there are many more `TikZ` shapes in the shapes library, which you can load using the command `\usetikzlibrary{shapes}`



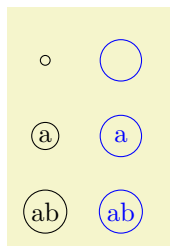
```
\begin{sseqpage}[no axes,classes={inner sep=0.4em},
                 class placement transform={scale=2}]
\class(0,0)
\class[rectangle](1,0)
\class[diamond](0,1)
\class[semicircle](1,1)
\class[regular polygon, regular polygon sides=5](2,2)
\class[regular polygon, regular polygon sides=6](2,2)
\class[regular polygon, regular polygon sides=7](2,2)
\class[regular polygon, regular polygon sides=8](2,2)
\end{sseqpage}
```

- A label " $\langle text \rangle$ " $\langle options \rangle$. This uses the TikZ quotes syntax, but the behavior specific to `sseqpages`. By default, the $\langle text \rangle$ is placed in the position **inside** the node – in effect, the $\langle text \rangle$ becomes the label text of the node (so saying `\class["label text"] (0,0)` causes a similar effect to saying `\node at (0,0) {label text};`). There are other position options such as `left`, `above left`, etc which cause the label text to be placed in a separate node positioned appropriately. In this case, any option that you may pass to a TikZ node will also work, including general coordinate transformations. If the placement is “inside”, then the only relevant $\langle options \rangle$ are those that alter the appearance of text, such as opacity and color.



```
\begin{sseqpage}[no axes,classes={minimum width=width("a")+0.5em}]
\class["a"] (0,0)
\class["a",red] (1,0)
\class["a" black,red] (2,0)
\class["b" above] (0,1)
\class["b" {above right,transform shape,rotate=-45}] (1,1)
\class["a" {above right={1em}}] (2,1)
\end{sseqpage}
```

- Options controlling the size of a node. This is typically useful to make the size of nodes consistent independent of the size of their label text. For instance:



```
\begin{sseqdata}[no axes,name=minimum width example]
\class["ab"] (0,0)
\class["a"] (0,1)
\class(0,2)
\end{sseqdata}
\printpage[name=minimum width example]
\printpage[name=minimum width example,
            change classes={blue,minimum width=width("ab")+0.5em}]
```

$\backslash d[\langle options \rangle] \langle page \rangle \langle coordinate \rangle$

This creates a differential starting at $\langle coordinate \rangle$ of length determined by the specified page. In order to use the `\d` command, you must specify the degree of the differentials as an option to the `sseqdata` or `sseqpage` environment.

```
\begin{sseqdata}[name=,degree={}{}]
\end{sseqdata}
```

This command will give an error unless

$\backslash structline[\langle options \rangle] \langle source coordinate \rangle \langle target coordinate \rangle$

3 The sseqdata Environment

The `sseqdata` environment is

4 \printpage and the sseqpage environment

5 Global options

name= $\langle sseq\ name \rangle$ (no default)

page= $\langle page\ number \rangle$ (no default, initially 0)

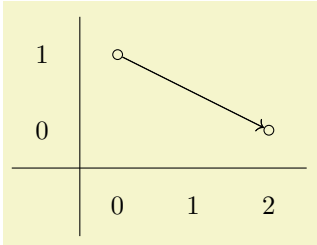
degree= $\{\langle x\ degree \rangle\}\{\langle y\ degree \rangle\}$ (no default)

cohomological Serre grading (no value)

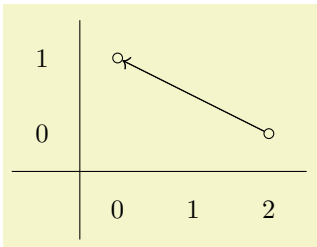
homological Serre grading (no value)

Adams grading (no value)

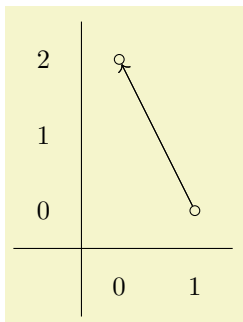
Specifies the degree of differentials. The $\langle x\ degree \rangle$ and $\langle y\ degree \rangle$ should both be mathematical expressions in one variable $\#1$ that evaluate to integers on any input. They specify the x and y displacement of a page $\#1$ differential. In practice, they will usually be linear expressions with $\#1$ coefficient 1, -1 , or 0. For instance:



```
\begin{sseqpage}[cohomological Serre grading]% equivalent to degree={\#1}{1-\#1}
\class(0,1)
\class(2,0)
\d2(0,1)
\end{sseqpage}
```



```
\begin{sseqpage}[homological Serre grading]% equivalent to degree={-\#1}{\#1-1}
\class(0,1)
\class(2,0)
\d2(2,0)
\end{sseqpage}
```



```
\begin{sseqpage}[Adams grading]% equivalent to degree={-1}{\#1-1}
\class(0,2)
\class(1,0)
\d2(1,0)
\end{sseqpage}
```

You can also specify the default degree of future spectral sequences by saying `\sseqset{degree}=\{\langle x\ degree \rangle\}\{\langle y\ degree \rangle\}` or `\sseqset{Adams grading}` outside of the `sseqdata` and `sseqpages` environments.

keep changes (no value)

x range= $\langle x\ min \rangle\langle x\ max \rangle$ (no default)

y range= $\langle y\ min \rangle\langle y\ max \rangle$ (no default)

These options force the x and y range to be a specific interval. By default, if no range is specified then the

<code>class placement transform=</code>	(no default)
<code>no differentials</code>	(no value)
<code>draw differentials</code>	(no value)
<code>no structlines</code>	(no value)
<code>draw structlines</code>	(no value)
<code>no orphan edges</code>	(no value)
<code>draw orphan edges</code>	(no value)

5.1 Global Coordinate Transformations

Of the normal TikZ coordinate transformations, only the following are allowed to be applied to a sseq diagram:

<code>xscale=$\langle factor \rangle$</code>	(no default)
<code>yscale=$\langle factor \rangle$</code>	(no default)
<code>xmirror</code>	(no value)
<code>ymirror</code>	(no value)
<code>rotate=$\langle angle \rangle$</code>	(no default)










5.2 Layout

<code>custom clip=</code>	(no default)
<code>clip=$\langle boolean \rangle$</code>	(default true)(initially true)
<code>x axis gap=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>y axis gap=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>axes gap=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>x label gap=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>y label gap=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>x axis start extend=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>y axis start extend=$\langle dimension \rangle$</code>	(no default, initially 0.5cm)
<code>x axis end extend=$\langle dimension \rangle$</code>	(no default, initially 0.9cm)
<code>y axis end extend=$\langle dimension \rangle$</code>	(no default, initially 0.9cm)
<code>x clip axis padding=$\langle dimension \rangle$</code>	(no default, initially 0.1cm)
<code>y clip axis padding=$\langle dimension \rangle$</code>	(no default, initially 0.1cm)
<code>right clip padding=$\langle dimension \rangle$</code>	(no default, initially 0.1cm)
<code>left clip padding=$\langle dimension \rangle$</code>	(no default, initially 0.4cm)
<code>top clip padding=$\langle dimension \rangle$</code>	(no default, initially 0.1cm)
<code>bottom clip padding=$\langle dimension \rangle$</code>	(no default, initially 0.4cm)

5.3 Axes Style

<code>x axis style=a</code>	(no default, initially <code>border</code>)
<code>y axis style=a</code>	(no default, initially <code>border</code>)
<code>axes style=</code>	(no default, initially <code>border</code>)
<code>x axis origin=</code>	(no default, initially 0)
<code>y axis origin=</code>	(no default, initially 0)
<code>no x axis</code>	(no value)
<code>no y axis</code>	(no value)
<code>no axes</code>	(no value)
<code>draw x axis</code>	(no value)
<code>draw y axis</code>	(no value)
<code>draw axes</code>	(no value)
<code>no x axis labels</code>	(no value)
<code>no y axis labels</code>	(no value)
<code>no axes labels</code>	(no value)
<code>draw x axis labels</code>	(no value)
<code>draw y axis labels</code>	(no value)
<code>draw axes labels</code>	(no value)
<code>x label step=</code>	(no default, initially 1)
<code>y label step=</code>	(no default, initially 1)
<code>label step=</code>	(no default, initially 1)
<code>rotate labels=<boolean></code>	(default <code>true</code>)(initially <code>false</code>)

A TikZ color:

2			
1			
0			
	0	1	2

```
\begin{sseqpage}[classes={fill,inner sep=0.4em}]
\class[red](0,0)
\class[blue](1,0)
\class[green](2,0)
\class[cyan](0,1)
\class[magenta](1,1)
\class[yellow](2,1)
\class[blue!50!red](0,2)
\class[green!30!yellow](1,2)
\class[blue!50!black](2,2)
\end{sseqpage}
```