Documentation for the use of the *tikzcivil* package

Cristóbal Tapia
crtapia@gmail.com

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0.1 Introduction

Chapter 1

Drawing for the Structural Analysis

1.1 Commands

1.1.1 `\Support` command

This command is used to generate different types of supports, like fixed, pinned or sliding supports. They can also be rotated.

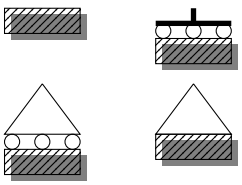


Figure 1.1: Types of supports available.

```
\begin{tikzpicture}[scale=1.0]
  \Support[width = 1cm, type=fixed]
  \Support[position={2cm,0cm}, angle=0,
           width = 1cm, type=fixedsliding]
  \Support[position={0cm,-2cm}, angle=0,
           width = 1cm, type=sliding]
  \Support[position={2cm,-2cm}, angle=0,
           width = 1cm, type=pinned]
\end{tikzpicture}
```

Table 1.1: Options for the `\Support` command

Option	Description	default
`widht`	defines de width of the support	**1cm**
`position`	(tuple) defines the position of the support	**{0,0}**
`type`	defines the type of support. Alternatives: `fixed`, `pinned`, `sliding`, `fixedsliding`	**fixed**
`angle`	rotation in degrees of the support (counterclockwise)	**0**

1.1.2 `\MassWithSpring` command

This command draws a typical mass-spring system. It supports also an optional damper and displacement. The basic behavior of this command is shown in fig. 1.2.

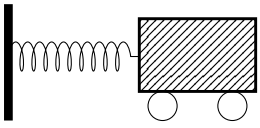


Figure 1.2: Mass-Spring system

```
\begin{tikzpicture}[scale=1]
  \MassWithSpring[]
\end{tikzpicture}
```

In many situations we would like to describe more interesting systems. This can be achieved applying the optional key values and using the command multiple times, as shown in fig 1.3. As it can bee seen, creating this kind of drawings is very easy and straightforward.

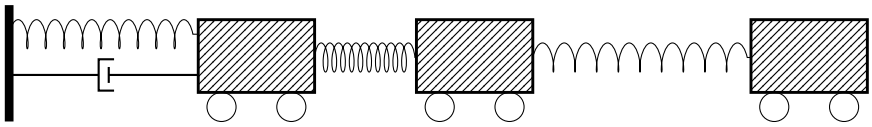
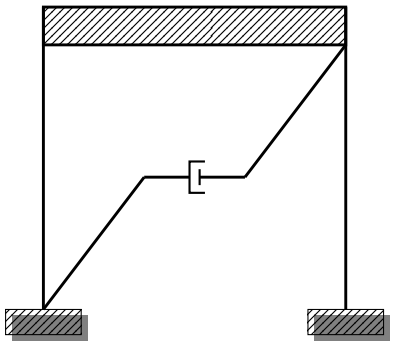


Figure 1.3: More complex mass-spring system

```
\begin{tikzpicture}[scale=1]
  \MassWithSpring[displacement = 2em, with damper = true]
  \MassWithSpring[displacement = -1em,  with wall = false,
                  position = {10.5em,0em}]
  \MassWithSpring[displacement = 3em,  with wall = false,
                  position = {18.0em,0em}]
\end{tikzpicture}
```

1.1.3 \Frame command

Thus command draws a frame with its mass concentrated above. It is a very common model to describe later a multi-story building in 2D. This command has many options, useful to change the displacement, position, use of supports, damper, among others. In the fig. 1.4 can be seen the normal output of the command without any options.



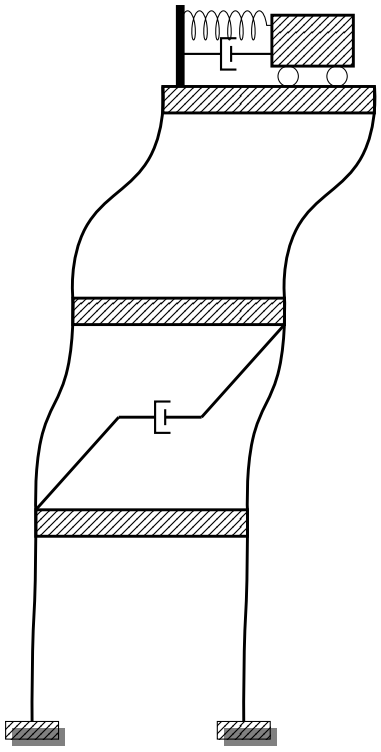
```
\begin{tikzpicture}[scale=1]
  \Frame[with damper=true]
\end{tikzpicture}
```

Figure 1.4: A frame with the mass concentrated at the top.

As with the \MassWithSpring command, we can create more complex structures, and even add some displacement to it or add a tuned mass damper on the top (why not?). This can be seen on fig. 1.5.

Table 1.2: Options for the `\Frame` command

Option	Description	default
`height`	defines the height of the frame/story	**4cm**
`widht`	defines de width of the frame	**4cm**
`mass thickness`	defines the thickness of the concentrated mass	**0.4cm**
`position`	(tuple) defines the position of the base of the left column	**{0,0}**
`with support`	boolean option, that allows to show supports or not	**true**
`with damper`	boolean option, that defines the presence of a damper in the system	**false**
`displacement`	defines the amount of horizontal displacement on the top of the frame	**0cm**



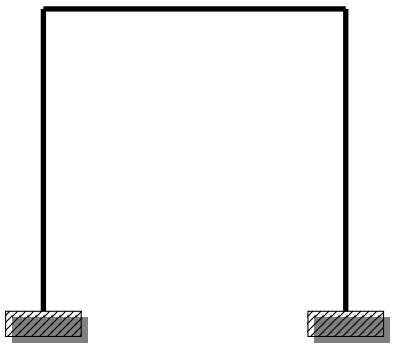
```
\begin{tikzpicture}[scale=0.7]
  \Frame[position = {0em,0em}, displacement=0.07cm]
  \Frame[position = {0.07cm,4cm}, with support=false,
      displacement=0.7cm]
  \Frame[position = {0.77cm,8cm}, with support=false,
      displacement=1.7cm]
  \MassWithSpring[position={2.8cm,12cm}, with damper=
      true]
\end{tikzpicture}
```

Figure 1.5: A set of frames put one above he other.

1.1.4 `\FrameSimple` command

The `\Frame` command is best suited for dynamic systems, so when we want to draw a frame for other purposes, we should use this command. It creates a nice frame with bars, whose support's type can be changed. It also allows to vary its dimensions (width and hight) and makes possible to move each degree of freedom separately[1].

[1] Not yet implemented



```
  \begin{tikzpicture}[scale=1]
\FrameSimple[]
  \end{tikzpicture}
```

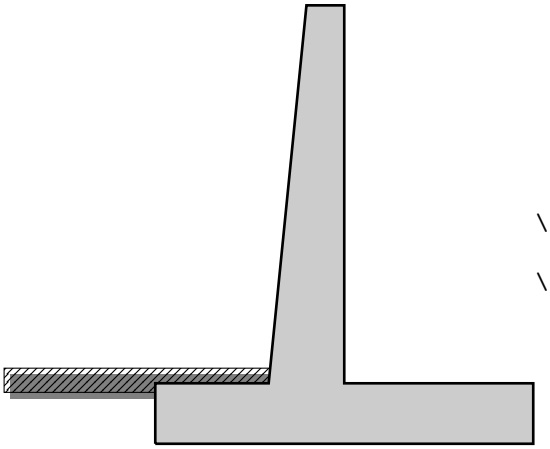
Figure 1.6: A simple frame.

Chapter 2

Drawings for the Geomechanics

2.1 Commands

2.1.1 `\RetainingWall` command



```
\begin{tikzpicture}[scale=1]
  \RetainingWall[]
\end{tikzpicture}
```

Figure 2.1: Retaining Wall