HUMBOLDT-UNIVERSITÄT ZU BERLIN

LaTeX for Linguists

LaTeX 8: Venn diagram & vowel diagram

Sebastian Nordhoff & Antonio Machicao y Priemer

www.linguistik.hu-berlin.de/staff/amyp

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Venn diagram

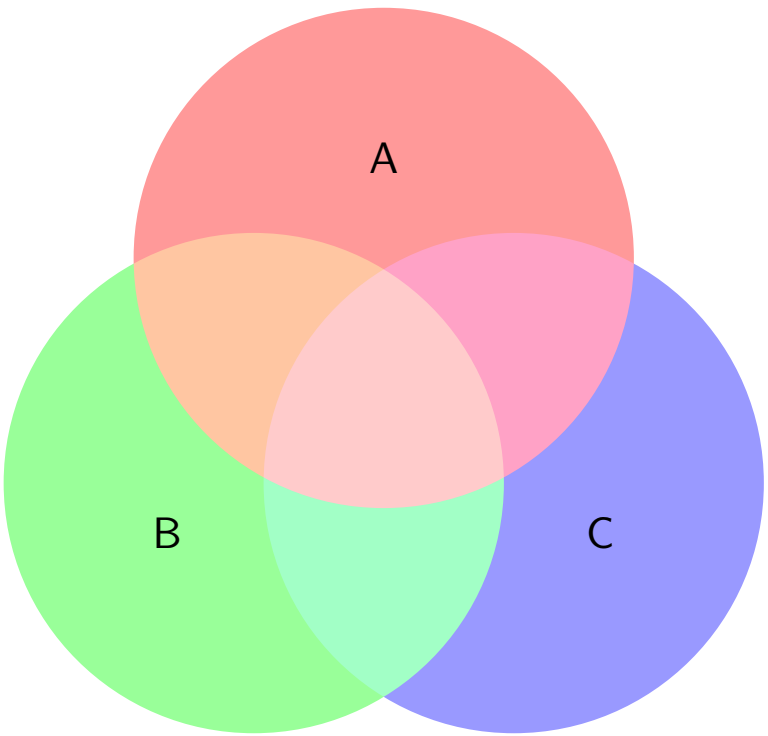
Venn diagrams can be drawn with the `tikz` **package**. It is quite **complex**, but the results are **perfect**. Mostly you can find the code for what you are trying to draw in the internet.

An easier way to draw venn diagrams is using the `venndiagram` **package**. It is based on `TikZ`, but it has less options.

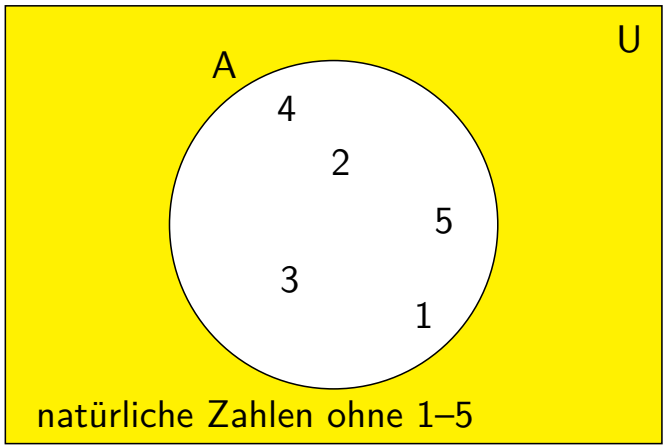
Drawing with TikZ

Venn diagrams can be drawn with the `tikz` package. It is quite **complex**, but the results are **perfect**. Mostly you can find the code for what you are trying to draw in the internet.

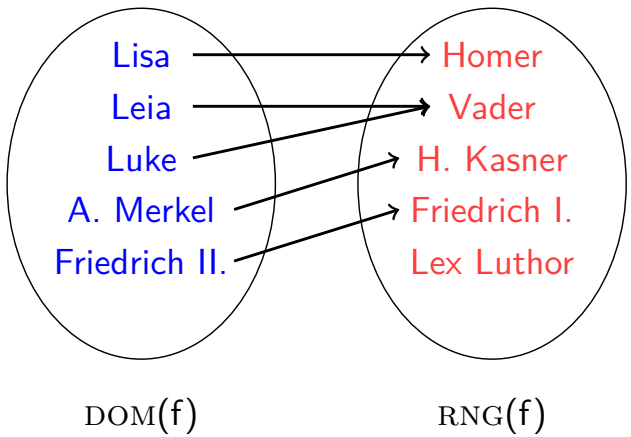
```
\begin{tikzpicture}

\begin{scope}[blend group=soft light]
\fill[red!40!white]
(90:1.2) circle (2);
\fill[green!40!white]
(210:1.2) circle (2);
\fill[blue!40!white]
(330:1.2) circle (2);
\end{scope}

\node at (90:2)   {A};
\node at (210:2)  {B};
\node at (330:2)  {C};

\end{tikzpicture}
```



```
\begin{tikzpicture}
\def\firstrectangle{(0,0) rectangle (6,4)}
\def\firstcircle{(3,2) circle (1.5cm)}
\def\secondcircle{(0:2cm) circle (1.5cm)}

\begin{scope}[shift={(-3cm,2cm)}]
\clip \firstrectangle;
\fill[yellow] \firstrectangle;
\fill[white] \firstcircle;
\end{scope}

\begin{scope}[shift={(-3cm,2cm)}]
\draw \firstcircle;
\draw \firstrectangle;
\node at (33:6.8) {U};
\node at (60:4)   {A};
\node at (40:4)   {2};
\node at (30:3)   {3};
\node at (17:4)   {1};
\node at (50:4)   {4};
\node at (27:4.5) {5};
\node at (6.9:2.3) {natürliche Zahlen ohne 1--5};
\end{scope}
\end{tikzpicture}
```



```
\begin{tikzpicture}
\def\firstellipse{(0,0) ellipse (1.3cm and 1.7cm)}
\def\secondellipse{(3.4,0) ellipse (1.3cm and 1.7cm)}
\begin{scope}
\draw \firstellipse ;
\draw \secondellipse ;
\node at (90:-2.25) {\textsc{dom}(f)};
\node at (90:1.25)  {\blue{Lisa}};
\node at (90:.75)   {\blue{Leia}};
\node at (90:.25)   {\blue{Luke}};
\node at (90:-.25)  {\blue{A. Merkel}};
\node at (90:-.75)  {\blue{Friedrich II.}};
\node at (3.4,-2.25) {\textsc{rng}(f)};
\node at (3.4,1.25)  {\alert{Homer}};
\node at (3.4,.75)   {\alert{Vader}};
\node at (3.4,.25)   {\alert{H. Kasner}};
\node at (3.4,-.25)  {\alert{Friedrich I.}};
\node at (3.4,-.75)  {\alert{Lex Luthor}};
\draw[thick,->] (.5,1.25) -- (2.8,1.25);
\draw[thick,->] (.5,.75) -- (2.8,.75);
\draw[thick,->] (.5,.25) -- (2.8,.75);
\draw[thick,->] (.9,-.25) -- (2.5,.25);
\draw[thick,->] (.9,-.75) -- (2.5,-.25);
\end{scope}
\end{tikzpicture}
```



Drawing with venndiagram

Load the package:

```
\usepackage{venndiagram}
```

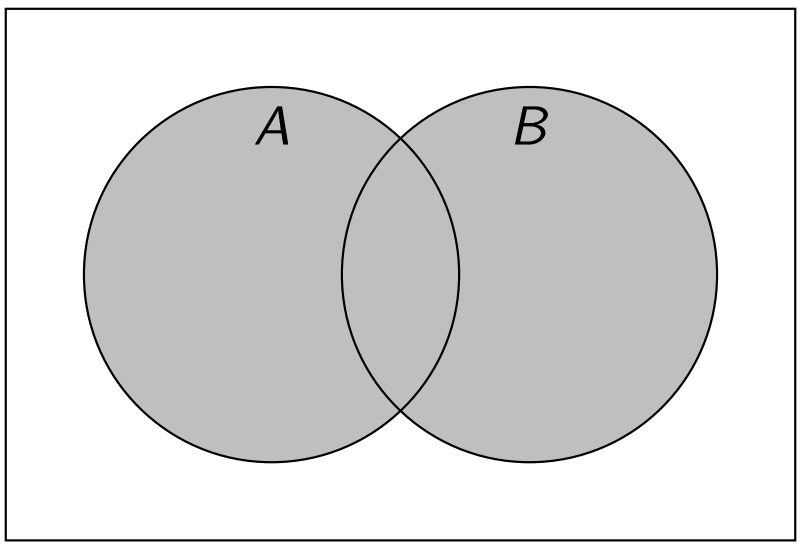
This package defines two environments:

1. Venn diagrams with two sets
2. Venn diagrams mwith three sets

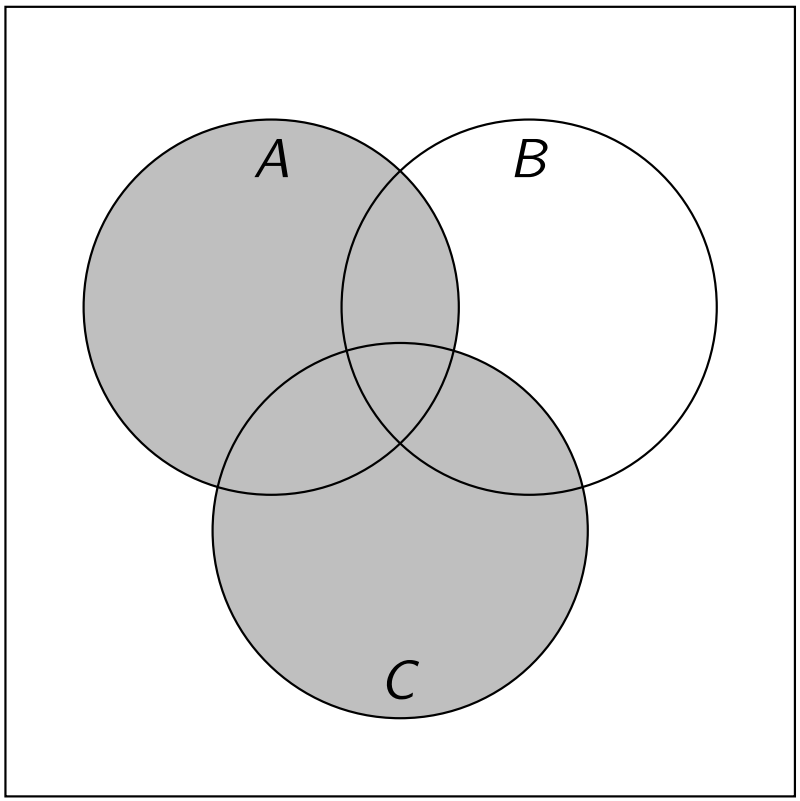
```
\begin{venndiagram2sets}

\end{venndiagram2sets}
```

```
\begin{venndiagram3sets}

\end{venndiagram3sets}
```

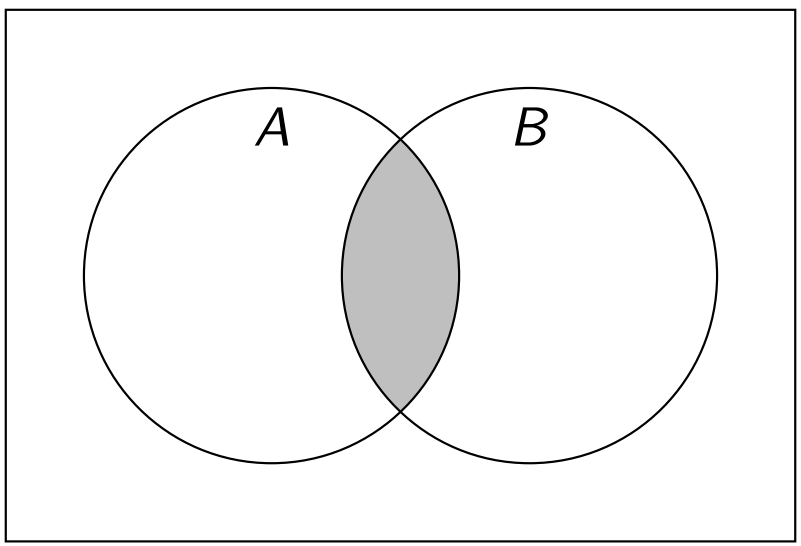
```
\begin{venndiagram2sets}
\fillA \fillB
\end{venndiagram2sets}
```



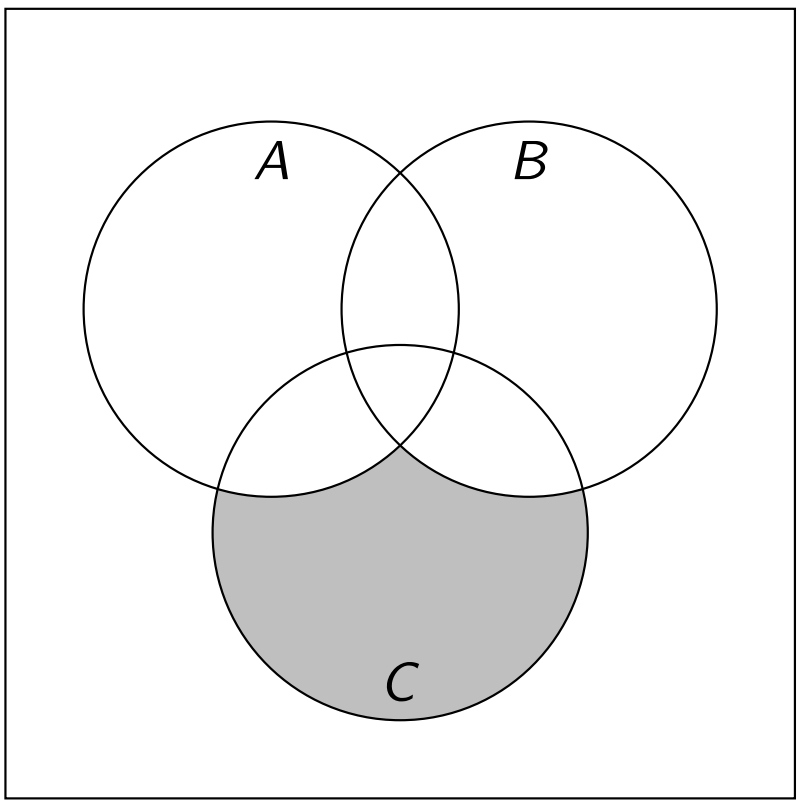

```
\begin{venndiagram3sets}
\fillA \fillC
\end{venndiagram2sets}
```



```
\begin{venndiagram2sets}
\fillACapB
\end{venndiagram2sets}
```

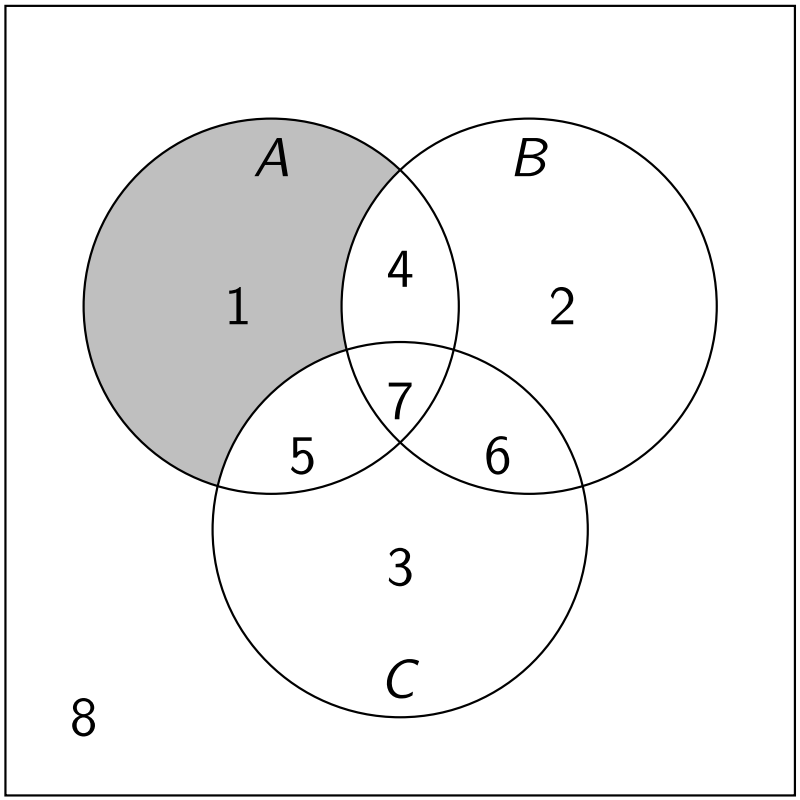



```
\begin{venndiagram3sets}
\fillOnlyC
\end{venndiagram2sets}
```



Elements of the sets are given as options to the environment.

```
\begin{venndiagram3sets}[
labelOnlyA={1},
labelOnlyB={2},
labelOnlyC={3},
labelOnlyAB={4},
labelOnlyAC={5},
labelOnlyBC={6},
labelABC={7},
labelNotABC={8}
]

\fillOnlyA
\end{venndiagram3sets}
```



Further features

- For further features, check the package documentation (Talbot, 2016).
- For complex diagrams, it is recommendable to use `TikZ`.

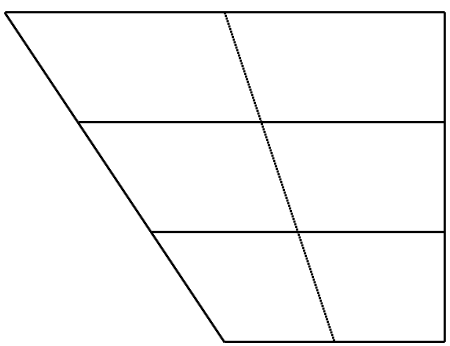
Vowel diagram

Load the package `vowel` (it works with the package `tipa`):

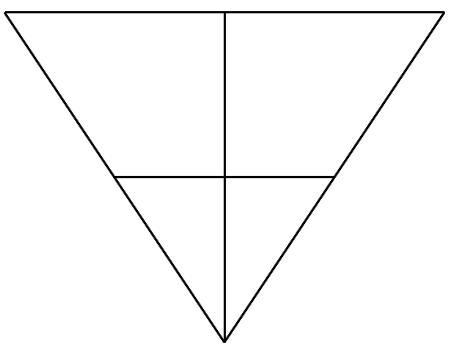
```
\usepackage{vowel}
```

Vowel provides a `vowel` **environment** with different **options**:

```
\begin{vowel}
\end{vowel}
```



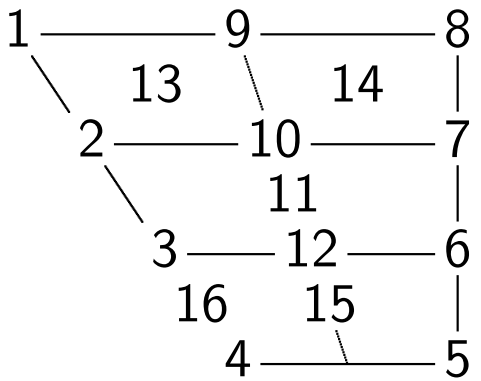
```
\begin{vowel}[triangle,three]
\end{vowel}
```



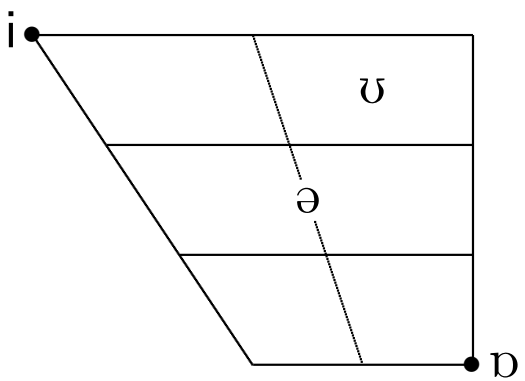
Vowels can be included with the command `putcvowel`.

```
\putcvowel[l|r]{x}{y}
```

- Options: `l` or `r` → left or right of a node `y`
- Arguments:
  `x` → IPA symbol
  `y` → position in the diagram (every position in the diagram has a number!)




```
\begin{vowel}
\putcvowel[l]{i}{1}
\putcvowel[l]{\textscripta}{5}
\putcvowel{\textschwa}{11}
\putcvowel{\textupsilon}{14}
\end{vowel}
```

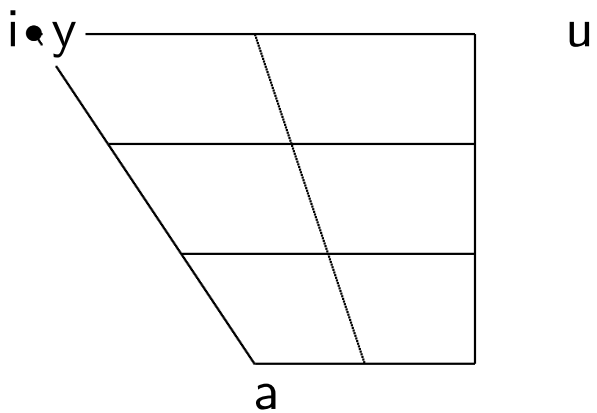


Vowels can be included with the command `putvowel`.

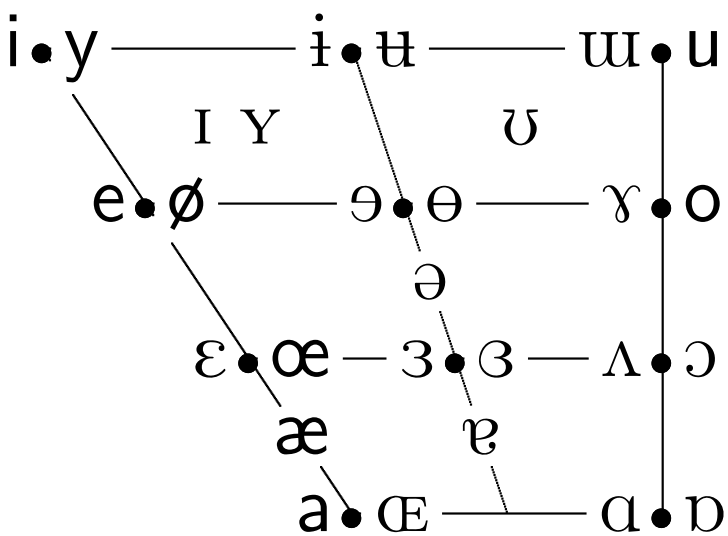
```
\putvowel[l|r]{x}{z}{w}
```

- Options: `l` or `r` → left or right of a node `y`
- Arguments:
  `x` → IPA symbol
  `z` → coordinate on x axis
  `w` → coordinate on y axis

```
\begin{vowel}
\putvowel[l]{i}{0pt}{0pt}
\putvowel[r]{y}{0pt}{0pt}
\putvowel{a}{42pt}{66pt}
\putvowel{u}{99pt}{0pt}
\end{vowel}
```



```
\begin{vowel}
\putcvowel[l]{i}{1}
\putcvowel[r]{y}{1}
\putcvowel[l]{e}{2}
\putcvowel[r]{\o}{2}
\putcvowel[l]{\textepsilon}{3}
\putcvowel[r]{\oe}{3}
\putcvowel[l]{a}{4}
\putcvowel[r]{\textscoelig}{4}
\putcvowel[l]{\textscripta}{5}
\putcvowel[r]{\textturnscripta}{5}
\putcvowel[l]{\textturnv}{6}
\putcvowel[r]{\textopeno}{6}
\putcvowel[l]{\textramshorns}{7}
\putcvowel[r]{o}{7}
\putcvowel[l]{\textturnm}{8}
\putcvowel[r]{u}{8}
\putcvowel[l]{\textbari}{9}
\putcvowel[r]{\textbaru}{9}
\putcvowel[l]{\textreve}{10}
\putcvowel[r]{\textbaro}{10}
\putcvowel{\textschwa}{11}
\putcvowel[l]{\textrevepsilon}{12}
\putcvowel[r]{\textcloserevepsilon}{12}
\putcvowel{\textsci\ \textscy}{13}
\putcvowel{\textupsilon}{14}
\putcvowel{\textturna}{15}
\putcvowel{\ae}{16}
\end{vowel}
```



Further features

Check the documentation (Rei, 2001) for more features.

Check also Felix Kopecky's solution (for Language Science Press) with `TikZ`:
`http://userblogs.fu-berlin.de/langsci-press/2016/06/15/drawing-vowel-charts-with-tikz/`

Internet sources I

- Link: Drawing vowel charts with TikZ – Felix Kopecky:
  `https://userblogs.fu-berlin.de/langsci-press/2016/06/15/drawing-vowel-charts-with-tikz/`
  [Access: 08/12/2018]
- Link: Language Science Press
  `www.langsci-press.org`
  [Access: 02/01/2019]
- Link: LaTeX Coffee Stains – Hanno Rein.
  `http://hanno-rein.de/downloads/coffee.pdf`
  [Access: 12/01/2019]
- Link: LaTeX/Special Characters.
  `https://en.wikibooks.org/wiki/LaTeX/Special_Characters`
  [Access: 02/01/2019]
- Link: Type IPA phonetic symbols.
  `http://ipa.typeit.org/full/`
  [Access: 02/01/2019]

Literature I

Freitag, Constantin & Antonio Machicao y Priemer. 2015. LaTeX-Einführung für Linguisten. Manuscript. https://www.linguistik.hu-berlin.de/de/staff/amyp/latex-einfuehrung.

Knuth, Donald E. 1986. *The TeX book*. Boston: Addison-Wesley.

Kopka, Helmut. 1994. *LaTeX: Einführung*, vol. 1. Bonn: Addison-Wesley.

Rei, Fukui. 2001. vowel – Draw vowel charts for phonetic research. *CTAN: Comprehensive TeX Archive Network* https://ctan.org/pkg/vowel.

Talbot, Nicola L. C. 2016. venndiagram v1.1: Drawing simple venn diagrams. *CTAN: Comprehensive TeX Archive Network* https://ctan.org/pkg/venndiagram.