

Отчёт по лабораторной работе №4

Including Graphics

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1 Цель работы

Целью данной лабораторной работы является ознакомление с основами включения графики в документы LaTeX.

The purpose of this lab work is to learn how to include and manipulate graphics in LaTeX documents using the graphicx package and related tools.

2 Задание

1. Study basic image inclusion with graphicx package
2. Learn to modify graphic appearance (size, rotation, scaling)
3. Understand float environments for image placement
4. Practice file naming and organization best practices
5. Learn cross-referencing for figures
6. Explore different float types and positioning options
7. Complete the exercises with practical examples

3 Теоретическое введение

3.1 4 Включение графики / Including Graphics

Для включения внешних изображений в LaTeX используется пакет graphicx, который предоставляет команду \includegraphics. To include external images in LaTeX, use the graphicx package which provides the

\includegraphics command.

The screenshot shows the TeXworks interface with two tabs: 'First.tex' and 'First.pdf'. The 'First.tex' tab contains the following LaTeX code:

```

1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \begin{document}
5 This picture
6 \begin{center}
7 \includegraphics[height=2cm]{example-image}
8 \end{center}
9 is an imported PDF.
10 \end{document}

```

The 'First.pdf' tab shows the resulting PDF document with the text "This picture" and a centered image placeholder labeled "Image".

```

\documentclass{article}
\usepackage[T1]{fontenc}
\usepackage{graphicx}
\begin{document}
This picture
\begin{center}
\includegraphics[height=2cm]{example-image}
\end{center}
is an imported PDF.
\end{document}

```

3.2 4.1 Изменение внешнего вида графики / Altering Graphic Appearance

Команда \includegraphics имеет множество опций для управления размером и формой изображений.
The \includegraphics command has many options to control image size and appearance.

```

\documentclass{article}

\usepackage[T1]{fontenc}

\usepackage{graphicx}

\begin{document}

\begin{center}

\includegraphics[height = 0.5\textheight]{example-image}

\end{center}

Some text

\begin{center}

\includegraphics[width = 0.5\textwidth]{example-image}



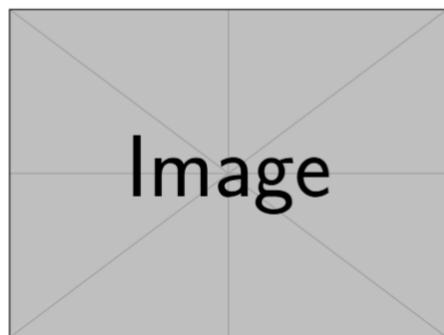
```

```
\end{center}
```

```
\end{document}
```

```
TeX second.tex
1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \begin{document}
5 \begin{center}
6 \includegraphics[height = 0.5\textheight]{example-image}
7 \end{center}
8 Some text
9 \begin{center}
10 \includegraphics[width = 0.5\textwidth]{example-image}
11 \end{center}
12 \end{document}
```

second.pdf



```
\documentclass{article}
```

```
\usepackage[T1]{fontenc}
```

```
\usepackage{graphicx}
```

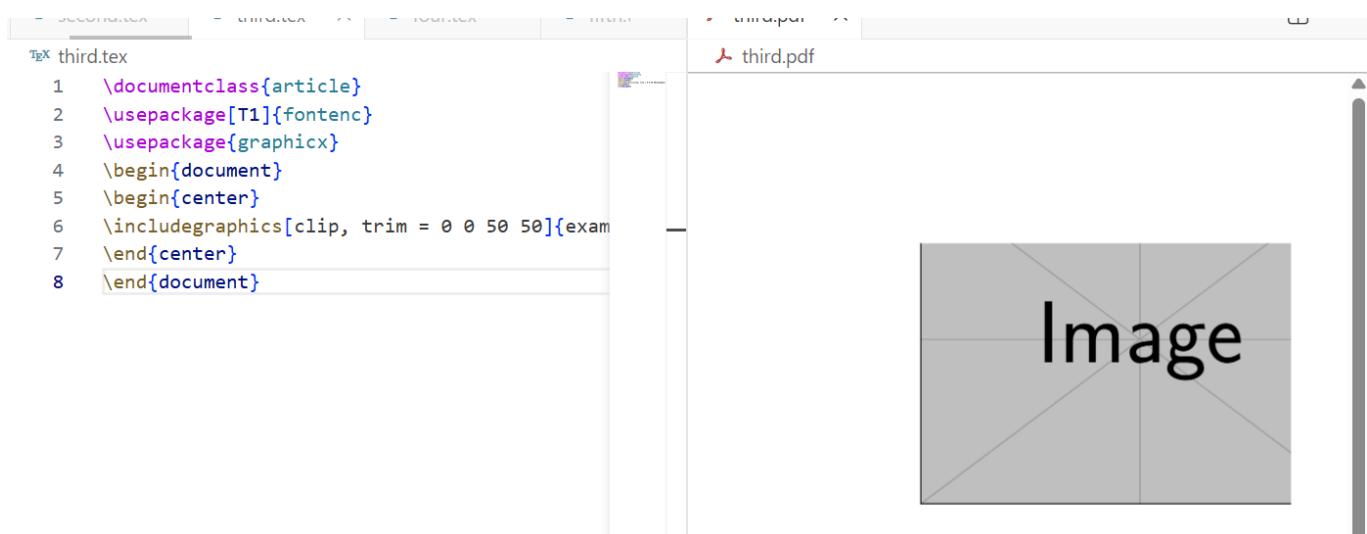
```
\begin{document}
```

```
\begin{center}
```

```
\includegraphics[clip, trim = 0 0 50 50]{example-image}
```

```
\end{center}
```

```
\end{document}
```



```
1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \begin{document}
5 \begin{center}
6 \includegraphics[clip, trim = 0 0 50 50]{example-image-a.png}
7 \end{center}
8 \end{document}
```

3.3 4.2 Создание плавающих изображений / Making Images Float

Изображения обычно включаются как плавающие объекты (floats) чтобы избежать больших пробелов на странице. Images are typically included as floats to avoid large gaps on the page.

```
\documentclass{article}
\usepackage[T1]{fontenc}
\usepackage{graphicx}
\usepackage{lipsum} % produce dummy text as filler
\begin{document}
\lipsum[1-4] % Just a few filler paragraphs
Test location.
\begin{figure}[ht]
\centering
\includegraphics[width=0.5\textwidth]{example-image-a.png}
\caption{An example image}
\end{figure}
\lipsum[6-10] % Just a few filler paragraphs
\end{document}
```

The screenshot shows a LaTeX editor interface with two panes. The left pane displays the TeX code for 'four.tex', which includes document class definitions, package imports, and several sections of dummy text ('lipsum'). The right pane shows the resulting PDF document, 'four.pdf', which contains the same text and a large letter 'A' centered on the page.

```

1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \usepackage{lipsum} % produce dummy text as filler
5 \begin{document}
6 \lipsum[1-4] % Just a few filler paragraphs
7 Test location.
8 \begin{figure}[ht]
9 \centering
10 \includegraphics[width=0.5\textwidth]{example}
11 \caption{An example image}
12 \end{figure}
13 \lipsum[6-10] % Just a few filler paragraphs
14 \end{document}

```

3.4 4.3 Именование графических файлов / Naming Graphics Files

Рекомендуется использовать простые имена файлов без пробелов и специальных символов. It's recommended to use simple file names without spaces or special characters.

```
\includegraphics[width=30pt]{pics/myimage.png}
```

3.5 4.4 Хранение графики в поддиректории / Storing Graphics in Subdirectory

Для организации файлов изображения можно хранить в поддиректориях. To organize files, images can be stored in subdirectories.

```
\graphicspath{{figs/}{pics/}}
```

3.6 4.5 Создание графики / Producing Graphics

LaTeX поддерживает различные форматы изображений. Предпочтительно использовать PDF для векторной графики. LaTeX supports various image formats. PDF is preferred for vector graphics.

```
% создания графики с TikZ
\documentclass{article}
\usepackage{tikz}
\begin{document}
\begin{tikzpicture}
\draw (0,0) circle (1cm);

```

```
\draw (-1,0) -- (1,0);  
\end{tikzpicture}  
\end{document}
```

3.7 4.6 Размещение плавающих объектов / Placing Floats

Пакет float предоставляет опцию H для точного размещения плавающих объектов. The float package provides the H option for precise float placement.

```
\documentclass{article}  
  
\usepackage[T1]{fontenc}  
  
\usepackage{graphicx}  
  
\usepackage{lipsum} % dummy text for filler  
  
\usepackage{float}  
  
\begin{document}  
  
\lipsum[1-7]  
  
\begin{figure}[H]  
  
\centering  
  
\includegraphics[width=0.5\textwidth]{example-image}  
  
\caption{An example image}  
  
\end{figure}  
  
\lipsum[8-15]  
  
\end{document}
```

TIITP.tex

```

1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \usepackage{lipsum} % dummy text for filler
5 \usepackage{float}
6 \begin{document}
7 \lipsum[1-7]
8 \begin{figure}[H]
9 \centering
10 \includegraphics[width=0.5\textwidth]{example-image}
11 \caption{An example image}
12 \end{figure}
13 \lipsum[8-15]
14 \end{document}

```



3.8 4.7 Другие типы плавающих объектов / Other Types of Float

Пакет `trivfloat` позволяет создавать новые типы плавающих сред. The `trivfloat` package allows creating new types of float environments.

```

\documentclass{article}
\usepackage[T1]{fontenc}
\usepackage{graphicx}
\usepackage{lipsum} % dummy text for filler
\usepackage{trivfloat}
\trivfloat{image}
\begin{document}
\begin{image}
\centering
\includegraphics[width=0.5\textwidth]{example-image}
\caption{An example image}
\end{image}
\end{document}

```

The screenshot shows a LaTeX editor interface with two panes. The left pane, titled 'TeX sixth.tex', displays the following code:

```
1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage{graphicx}
4 \usepackage{lipsum} % dummy text for filler
5 \usepackage{trivfloat}
6 \trivfloat{image}
7 \begin{document}
8 \begin{image}
9 \centering
10 \includegraphics[width=0.5\textwidth]{example}
11 \caption{An example image}
12 \end{image}
13 \end{document}
```

The right pane, titled 'sixth.pdf', shows the generated PDF document. It contains a square image divided into four quadrants by diagonal lines. The word 'Image' is centered in the bottom-right quadrant. Below the image, the caption 'Image 1: An example image' is displayed.

3.9 4.8 Перекрёстные ссылки / Cross-referencing

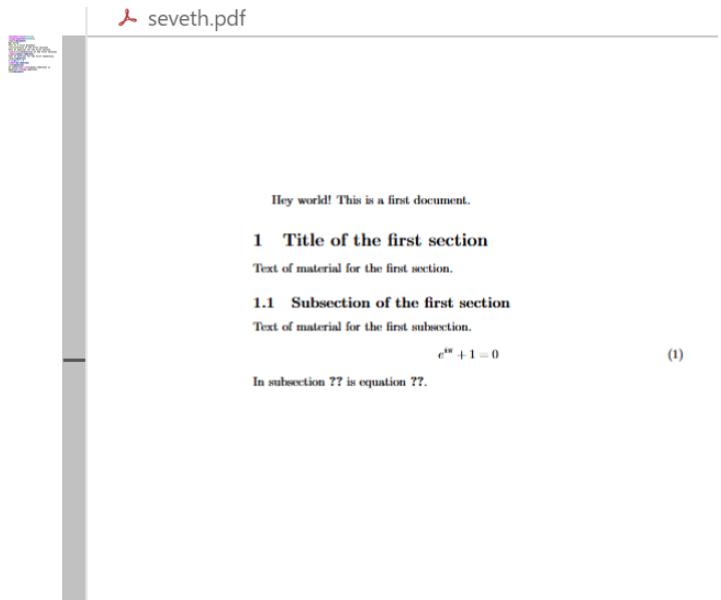
Механизм `\label` и `\ref` позволяет создавать ссылки на пронумерованные элементы. The `\label` and `\ref` mechanism allows creating references to numbered elements.

```
\documentclass{article}
\usepackage[T1]{fontenc}
\begin{document}
Hey world!
This is a first document.
\section{Title of the first section}
Text of material for the first section.
\subsection{Subsection of the first section}
\label{subsec:labelone}
Text of material for the first subsection.
\begin{equation}
e^{i\pi} + 1 = 0
\label{eq:labeltwo}
\end{equation}
In subsection~\ref{subsec:labelone} is
equation~\ref{eq:labeltwo}.
\end{document}
```

`\tex` seveth.tex

```

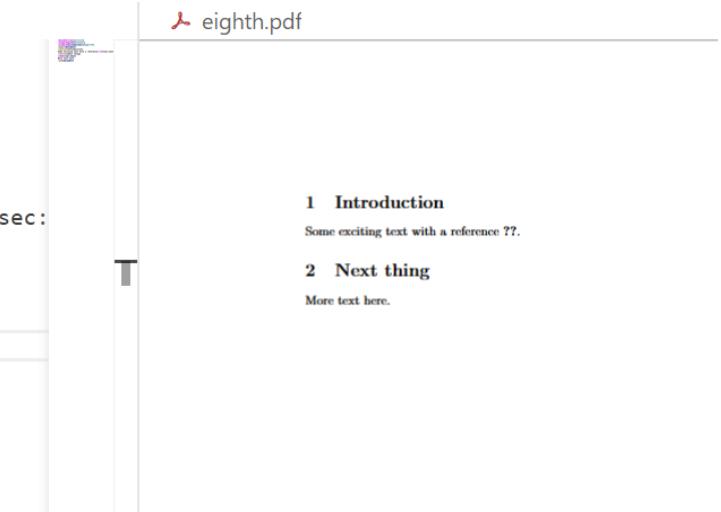
1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \begin{document}
4 Hey world!
5 This is a first document.
6 \section{Title of the first section}
7 Text of material for the first section.
8 \subsection{Subsection of the first section}
9 \label{subsec:labelone}
10 Text of material for the first subsection.
11 \begin{equation}
12 e^{i\pi}+1 = 0
13 \label{eq:labeltwo}
14 \end{equation}
15 In subsection~\ref{subsec:labelone} is
16 equation~\ref{eq:labeltwo}.
17 \end{document}
```



`\tex` eighth.tex

```

1 \documentclass{article}
2 \usepackage[T1]{fontenc}
3 \usepackage[hidelinks]{hyperref}
4 \begin{document}
5 \section{Introduction}
6 Some exciting text with a reference~\ref{sec:next}.
7 \section{Next thing}
8 \label{sec:next}
9 More text here.
10 \end{document}
```



`\documentclass{article}`

`\usepackage[T1]{fontenc}`

`\usepackage[hidelinks]{hyperref}`

`\begin{document}`

`\section{Introduction}`

Some exciting text with a reference~\ref{sec:next}.

`\section{Next thing}`

`\label{sec:next}`

More text here.

`\end{document}`

	Name	Date modified	Type	Size
	eighth.out	25/01/2026 11:36 pm	OUI File	1 KB
	eighth	25/01/2026 11:36 pm	WPS PDF Document	40 KB
	eighth	25/01/2026 11:36 pm	Исходный файл LaTeX	1 KB
	seventh.aux	25/01/2026 11:34 pm	AUX File	1 KB
	seventh	25/01/2026 11:34 pm	Text Document	4 KB
	seventh	25/01/2026 11:34 pm	WPS PDF Document	79 KB
	seventh	25/01/2026 11:34 pm	Исходный файл LaTeX	1 KB
	sixth.aux	25/01/2026 11:32 pm	AUX File	1 KB
	sixth	25/01/2026 11:32 pm	Text Document	6 KB
	sixth	25/01/2026 11:32 pm	WPS PDF Document	29 KB
	sixth	25/01/2026 11:31 pm	Исходный файл LaTeX	1 KB
	fifth.aux	25/01/2026 11:30 pm	AUX File	1 KB
	fifth	25/01/2026 11:30 pm	Text Document	6 KB
	fifth	25/01/2026 11:30 pm	WPS PDF Document	45 KB
	fifth	25/01/2026 11:30 pm	Исходный файл LaTeX	1 KB
	four	25/01/2026 11:18 pm	Text Document	6 KB
	four	25/01/2026 11:18 pm	WPS PDF Document	29 KB

4 Выполнение лабораторной работы

4.1 4.10 Упражнения / Exercises

4.1.1 Упражнение 1: Включение собственного изображения / Including Your Own Image

```
\documentclass{article}

\usepackage{graphicx}

\begin{document}

\begin{figure}[ht]

\centering

% \includegraphics[width=0.7\textwidth]{my-photo.jpg}

\caption{My Photo from LAB04 Folder}

\label{fig:photo1}

\end{figure}

\end{document}
```

TEX nineth.tex > {} Figure: My Photo from LAB04 Folder

```

1 \documentclass{article}
2 \usepackage{graphicx}
3
4 \begin{document}
5 \begin{figure}[ht]
6   \centering
7   % \includegraphics[width=0.7\textwidth]{m
8   \caption{My Photo from LAB04 Folder}
9   \label{fig:photo1}
10 \end{figure}
11
12 \end{document}

```

TEX nineth.pdf



Figure 1: My Photo from LAB04 Folder

4.1.2 Упражнение 2: Исследование опций размера и поворота / Exploring Size and Rotation Options

```

\documentclass{article}

\usepackage{graphicx}

\begin{document}

\includegraphics[height=3cm]{my-photo.jpg}

\includegraphics[width=0.3\textwidth]{my-photo.jpg}

\includegraphics[scale=0.5]{my-photo.jpg}

\includegraphics[angle=45, width=0.2\textwidth]{my-photo.jpg}

\end{document}

```

TEX tenth.tex

```

1 \documentclass{article}
2 \usepackage{graphicx}
3
4 \begin{document}
5 \includegraphics[height=3cm]{my-photo.jpg}
6 \includegraphics[width=0.3\textwidth]{my-photo.jpg}
7 \includegraphics[scale=0.5]{my-photo.jpg}
8 \includegraphics[angle=45, width=0.2\textwidth]{my-photo.jpg}
9 \end{document}

```

TEX tenth.pdf




4.1.3 Упражнение 3: Сравнение textwidth и linewidth / Comparing textwidth and linewidth

```
\documentclass[twocolumn]{article}

\usepackage[utf8]{inputenc}

\usepackage[T2A]{fontenc}

\usepackage{graphicx}

\usepackage{lipsum}

\begin{document}

\lipsum[1]

\begin{figure}[ht]

\centering

\includegraphics[width=0.8\linewidth]{my-photo.jpg}

\caption{С использованием \textbackslash linewidth}

\end{figure}

\begin{figure}[ht]

\centering

\includegraphics[width=0.5\textwidth]{my-photo.jpg}

\caption{С использованием \textbackslash textwidth (50\%)}

\end{figure}

\lipsum[2-5]

\end{document}
```

```

TeX elev.tex > {} Figure: С использованием \textbackslash linewidth
1  \documentclass[twocolumn]{article}
2  \usepackage[utf8]{inputenc}
3  \usepackage[T2A]{fontenc}
4  \usepackage{graphicx}
5  \usepackage{lipsum}
6
7  \begin{document}
8  \lipsum[1]
9  \begin{figure}[ht]
10   \centering
11   \includegraphics[width=0.8\linewidth]{my-}
12   \caption{С использованием \textbackslash linewidth}
13 \end{figure}
14 \begin{figure}[ht]
15   \centering
16   \includegraphics[width=0.5\textwidth]{my-}
17   \caption{С использованием \textbackslash linewidth}
18 \end{figure}
19 \lipsum[2-5]
20 \end{document}

```



elev.pdf

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus en tellus sit amet tortor gravida placerat. Integer sapien est, facilisis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, ma- lamaida eu solvamus at nulla. Cuiusvis auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis egat orci sit amet orci dignissim rutrum. Nam ligula, fringilla a, euismod sodales,



Figure 2: С использованием \textwidth (50%)

bendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisi hendrerit mollis. Suscipit a, ipsum. Cras viverra fermentum felis. Curabitur nonnulla. Cum sociis natus penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus lucius mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, ma- lamaida eu solvamus at nulla. Cuiusvis auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis egat orci sit amet orci dignissim rutrum. Nam ligula, fringilla a, euismod sodales,

1

4.1.4 Упражнение 4: Размещение плавающих объектов с разными спецификаторами / Float Placement with Different Specifiers

```
\documentclass{article}
```

```
\usepackage[utf8]{inputenc}
```

```
\usepackage[T2A]{fontenc}
```

```
\usepackage{graphicx}
```

```
\usepackage{lipsum}
```

```
\begin{document}
```

```
\lipsum[1-2]
```

```
\begin{figure}[h]
```

```
 \centering
```

```
 \includegraphics[width=0.4\textwidth]{my-photo.jpg}
```

```
 \caption{Опция h (здесь)}
```

```
\end{figure}
```

```
\lipsum[3]
```

```
\begin{figure}[t]
```

```
 \centering
```

```
\includegraphics[width=0.4\textwidth]{example-image-b}

\caption{Опция t (верх)}

\end{figure}

\begin{figure}[b]
\centering

\includegraphics[width=0.4\textwidth]{example-image-c}

\caption{Опция b (низ)}

\end{figure}

\lipsum[4-8]

\end{document}
```

twelv.tex

```
twelv.tex > { } Figure: Опция h (здесь)
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3 \usepackage[T2A]{fontenc}
4 \usepackage{graphicx}
5 \usepackage{lipsum}
6
7 \begin{document}
8 \lipsum[1-2]
9 \begin{figure}[h]
10   \centering
11   \includegraphics[width=0.4\textwidth]{my-}
12   \caption{Опция h (здесь)}
13 \end{figure}
14 \lipsum[3]
15 \begin{figure}[t]
16   \centering
17   \includegraphics[width=0.4\textwidth]{exa-}
18   \caption{Опция т (верх)}
19 \end{figure}
20 \begin{figure}[b]
21   \centering
22   \includegraphics[width=0.4\textwidth]{exa-}
23   \caption{Опция б (низ)}
24 \end{figure}
25 \lipsum[4-8]
26 \end{document}
```

twelv.pdf

Figure 1: Опция h (здесь)

Figure 2: Опция т (верх)

Figure 3: Опция б (низ)

4.1.5 Упражнение 5: Перекрёстные ссылки и количество компиляций / Cross-references and Number of Compilations

```
\documentclass{article}

\usepackage[T1]{fontenc}

\usepackage{graphics}

\usepackage{lipsum}
```

```
\usepackage{float}  
\usepackage{amsmath}  
\usepackage[colorlinks]{hyperref}  
\begin{document}  
\section*{Exercise 5: Cross-references and Number of Compilations}  
\subsection*{Useful document}  
\subsubsection*{Section (Introduction)}  
\label{sec:intro}  
  
In section~\ref{sec:intro}, we present...  
  
\subsubsection*{Subsection (first subsection)}  
\label{sub:first}  
  
As seen in subsection~\ref{sub:first}...  
  
\begin{enumerate}  
    \item First point  
    \item Second point \label{item:second}  
    \item Reference to point~\ref{item:second}  
\end{enumerate}  
  
% \begin{figure}[ht]  
%   \centering  
%   \includegraphics[width=0.5\textwidth]{my-photo.jpg}  
%   \caption{Test figure}  
%   \label{fig:test}  
% \end{figure}  
  
% Figure~\ref{fig:test} shows...  
\end{document}
```

TEX thirt.tex > Exercise 5: Cross-references and Number of Compilations > thirt.pdf

```

1  \documentclass{article}
2  \usepackage[T1]{fontenc}
3  \usepackage{graphics}
4  \usepackage{lipsum}
5  \usepackage{float}
6  \usepackage{amsmath}
7  \usepackage[colorlinks]{hyperref}
8
9  \begin{document}
10
11 \section*{Exercise 5: Cross-references and Nu}
12
13 \subsection*{Useful document}
14
15 \subsubsection*{Section (Introduction)}
16 \label{sec:intro}
17
18 In section~\ref{sec:intro}, we present...
19
20 \subsubsection*{Subsection (first subsection)}
21
22 \label{sub:first}
23 As seen in subsection~\ref{sub:first}...
24
25 \begin{enumerate}
26 \item First point
27 \item Second point \label{item:second}
28 \item Reference to point~\ref{item:second}
29 \end{enumerate}

```

4.1.6 Упражнение 6: Размещение label до/после caption / Placing label Before/After caption

```

\documentclass{article}

\usepackage[utf8]{inputenc}

\usepackage[T2A]{fontenc}

\usepackage{graphicx}

\begin{document}

\begin{figure}[ht]

\centering

\includegraphics[width=0.4\textwidth]{example-image-a}

\label{fig:before}

\caption{Рисунок с label до caption}

\end{figure}

\begin{figure}[ht]

\centering

\includegraphics[width=0.4\textwidth]{my-photo.jpg}


```

```
\caption{Рисунок с label после caption}
```

```
\label{fig:after}
```

```
\end{figure}
```

Ссылка на рисунок~\ref{fig:before} (неправильная)\\

Ссылка на рисунок~\ref{fig:after} (правильная)

```
\end{document}
```

The screenshot shows a LaTeX development environment with two open files: `fourt.tex` and `fifteen.tex`. The `fourt.tex` file contains the following code:

```

1  \documentclass{article}
2  \usepackage[utf8]{inputenc}
3  \usepackage[T2A]{fontenc}
4  \usepackage{graphicx}
5
6  \begin{document}
7  \begin{figure}[ht]
8      \centering
9      \includegraphics[width=0.4\textwidth]{example-image-a}
10     \label{fig:before}
11     \caption{Рисунок с label до caption}
12 \end{figure}
13 \begin{figure}[ht]
14     \centering
15     \includegraphics[width=0.4\textwidth]{example-image-b}
16     \label{fig:after}
17     \caption{Рисунок с label после caption}
18 \end{figure}
19 Ссылка на рисунок~\ref{fig:before} (неправильная)
20 Ссылка на рисунок~\ref{fig:after} (правильная)
21 \end{document}

```

The `fifteen.tex` file is a preview of the `fourt.pdf` document. The `fourt.pdf` document contains two figures. Figure 1 is labeled "Рисунок с label до caption" and shows a large letter 'A' with a bounding box. Figure 2 is labeled "Рисунок с label после caption" and shows a person sitting at a table with a glass of red wine.

4.1.7 Упражнение 7: label после end{equation} / label After end{equation}

```
\documentclass{article}
```

```
\usepackage[T1]{fontenc}
```

```
\usepackage{graphicx}
```

```
\usepackage{lipsum}
```

```
\usepackage{float}
```

```
\usepackage{amsmath}
```

```
\usepackage{hyperref}
```

```
\title{Exercise 7: \textbackslash label After \textbackslash end\{equation\}}
```

```
\author{}
```

```
\date{}

\begin{document}

\maketitle

\section*{Exercise 7: \textbackslash label After \textbackslash end\{equation\} }

\begin{equation}
E = mc^2
\end{equation}

\label{eqafter} % AFTER end{equation} - INCORRECT

\begin{equation}
F = ma
\end{equation}

\label{eqinside} % INSIDE equation - CORRECT

\end{equation}

Reference to equation \ref{eqafter} (incorrect)

Reference to equation \ref{eqinside} (correct)

\textbf{Result:}

\begin{itemize}
\item \textbackslash label after \textbackslash end\{equation\} $\rightarrow$ incorrect reference (usually to previous equation or section)
\item \textbackslash label inside the equation environment $\rightarrow$ correct reference to the equation
\end{itemize}

\end{document}
```

The screenshot shows a LaTeX editor window with the file 'fifteen.tex' open. The code includes standard packages like documentclass, fontenc, graphicx, lipsum, float, amsmath, and hyperref. It defines a title, author, and date. The document begins with \begin{document} and \maketitle. A section titled 'Exercise 7: \textbackslash label After \textbackslash end\{equation\}' is shown. Inside this section, there are two equations: $E = mc^2$ labeled (1) and $F = ma$ labeled (2). A note states 'Reference to equation (incorrect)' with a red square icon, and 'Reference to equation (correct)' with a green checkmark icon. Below this, under 'Result:', it says: '• \label after \end{equation} → incorrect reference (usually to previous equation or section)' and '• \label inside the equation environment → correct reference to the equation'. At the bottom of the editor, a message says 'chktex could not be found.' A PDF preview window on the right shows the generated document with the equations and their labels.

```

1  \documentclass{article}
2  \usepackage[T1]{fontenc}
3  \usepackage{graphicx}
4  \usepackage{lipsum}
5  \usepackage{float}
6  \usepackage{amsmath}
7  \usepackage{hyperref}
8
9  \title{Exercise 7: \textbackslash label After \textbackslash end\{equation\}}
10 \author{}
11 \date{}
12
13 \begin{document}
14
15 \maketitle
16
17 \section*{Exercise 7: \textbackslash label After \textbackslash end\{equation\}}
18
19 \begin{equation}
20 E = mc^2
21 \end{equation}
22 \label{eqaft} % AFTER \end{equation} - INCORRECT
23
24 \begin{equation}
25 F = ma
26 \end{equation}
27 \label{eqinside} % INSIDE equation - CORRECT
28 \end{equation}
29 Reference to equation \ref{eqaft} (incorrect)

```

5 Выводы

В ходе лабораторной работы №4 я изучил основы включения и управления графикой в документах LaTeX. Освоил работу с пакетом graphicx, научился создавать плавающие объекты, управлять их размещением и создавать перекрёстные ссылки на изображения. Также изучил лучшие практики организации графических файлов и их именования.

In this lab work #4, I learned the fundamentals of including and manipulating graphics in LaTeX documents. I mastered the graphicx package, learned to create float objects, control their placement, and create cross-references to images. I also studied best practices for organizing graphic files and naming them.

Список литературы

LaTeX/Математические формулы — Викиучебник. <https://ru.wikibooks.org/wiki/LaTeX/>