

The Title of the Article*

First Author^{ab}, Second Author^{ac}, and Third Author^{de}

Abstract

Here comes the abstract of the article, which is a summary of the main results discussed in the article. It should contain neither mathematical formulas, nor references.

Keywords: computer science, L^AT_EX, article format

1 Introduction

The paper should be written in standard L^AT_EX using the provided `actacyb.cls` class file. Please do not use strange formats or non-standard packages. Avoid commands that would reconfigure the size of the page, the size and type of letters or the baselineskip.

The article in the first phase should be written including the `\showframe` package that makes the overfull boxes visible. Before sending the final version of your manuscript, please be sure that there are no such overfull boxes.

2 Pictures and figures

Every figure should appear in the `figure` environment, i.e. must be defined between `\begin{figure}` and `\end{figure}`. You should provide where you prefer to put your figure [`htbp`] (h – here, t – top, b – bottom, p – page), e.g., `\begin{figure}[!ht]` (insert figure here or top of next page if does not fit).

Primarily we use `pdflatex` to generate a PDF result of your document. As such, preferably include images in Portable Network Graphics (PNG) or Portable Document Format (PDF) formats with the e.g., `\includegraphics{example.png}` command. Alternatively L^AT_EX figures, PostScript(.ps) or Encapsulated PostScript(.eps) images can also be used with `latex` used for compiling.

*This work was supported by... If such a thanks text is included, use the `withtitlethanks` option of the `actacyb` document class!

^aAffiliation of first and second author

^bE-mail: firstauth@email.address, ORCID: [xxxx-xxxx-xxxx-xxxx](#)

^cE-mail: secondauth@email.address, ORCID: [xxxx-xxxx-xxxx-xxxx](#)

^dAffiliation of third author

^eE-mail: thirdauth@email.address, ORCID: [xxxx-xxxx-xxxx-xxxx](#)

Using drawing packages such as `tikz` or calling shell executables such as `pygmentize` may cause incompatibilities. If possible, try to generate a separate PDF file of these figures and include this PDF in the manuscript.

Before `\end{figure}` give a title to your figure within the `\caption{...}` command. To be able to refer to this figure later, label it with a unique identifier using the `\label{unique-label}` command. In the text you can refer to it with `\ref{unique-label}`. Let us consider the following example:

Figure `\ref{fig:example}` shows an example.

```
\begin{figure}[ht]
\begin{center}
\includegraphics[scale=1.0]{example.png}
\end{center}
\caption{The example figure\label{fig:example}}
\end{figure}
```

Figure 1 shows an example.

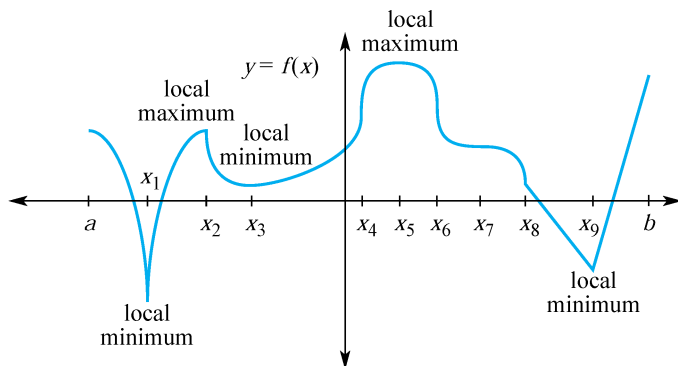


Figure 1: The example figure

3 Tables

Similarly to the procedure with figures, use the `table` environment to create tables. Normally, the title appears above the table, therefore put the `\caption{...}` command right after `\begin{table}[htbp]`. Use the `tabular` environment to prepare your table.

```
\begin{table}[ht]
\caption{This is an example table.}\label{tab:res}
\begin{center}
\begin{tabular}{l|rr}
```

```
Problem & Time(s) & Memory(MB) \\ \hline
easy    & 13    & 25    \\
hard    & 2359  & 6820 \\
\end{tabular}
\end{center}
\end{table}
Table \ref{tab:res} shows an example table.
```

Table 1: This is an example table.

Problem	Time(s)	Memory(MB)
easy	13	25
hard	2359	6820

Table 1 shows an example table.

4 Theorems and Lemmas

In the `actacyb` class the `amsthm` package is included. Thus, the most common environments, such as `definition`, `theorem`, `lemma`, `proposition`, `corollary`, `claim`, `remark`, `example` and `proof` are already defined. To define other environments, please use the `\newtheorem{othersenv}[theorem]{othersenv}` command. **Please do not redefine the `theoremstyle` or `theorem numbering`!**

By default, each “theorem” type is consecutively numbered: **Theorem 1**, **Theorem 2**, **Lemma 1**, etc. throughout the paper. You may specify the selection of this behaviour explicitly in `\documentclass` at the beginning of the document as

```
\documentclass[theoremcontinuousnumbering]{actacyb}
```

If you need numbering by sections, you should indicate it as an option to `\documentclass` as

```
\documentclass[theoremsectionnumbering]{actacyb}
```

Not numbered theorem environments can also be used by specifying the option `notnumberedtheorems` for `documentclass`. With theorem numbering selected, it is also possible to use not numbered theorems using the asterisk (*) at the end of the environment name, e.g., `theorem*`, `definition*`, `remark*`.

The `proof` environment automatically generates the end of proof (qed) symbol at the end of the proof. If you don’t need this symbol, redefine it to an empty command inside the proof environment (for the given proof only) or in the preamble (globally) as `\renewcommand{\qedsymbol}{}`.

By using a theorem numbering option, the following commands produce the result below:

```

\begin{definition*}
We define a not numbered definition...
\end{definition*}

\begin{theorem}
If  $N=1$ , then  $P=NP$ .
\end{theorem}

\begin{proof}
It is easy to see that if  $N=1$ , then  $NP=1 \cdot P = P$ .
\end{proof}

\begin{remark*}
This is a not numbered remark.
\end{remark*}

\begin{definition}
We define....
\end{definition}

\begin{remark}
Let us note that the above theorem is not...
\end{remark}

```

Definition. *We define a not numbered definition...*

Theorem 1. *If $N = 1$, then $P = NP$.*

Proof. It is easy to see that if $N = 1$, then $NP = 1 \cdot P = P$. □

Remark. This is a not numbered remark.

Definition 1. *We define....*

Remark 1. Let us note that the above theorem is not...

By specifying the `theoremsectionnumbering` option at the `documentclass` declaration, we would see **Definition**, **Theorem 4.1**, **Remark**, **Definition 4.1**, and **Remark 4.1** captions here, respectively.

5 Equations

The usual way to write equations is to use the `equation` environment for a single line of equation, and the `eqnarray` environment for multiline equations. It is also possible to use the `array` environment within an `equation`, but we do not recommend its usage, because its spacing and labeling may not give the desired result. Besides the `equation` and `eqnarray` environments, other `amstex` environments, such as `multiline`, `align`, `split`, etc. are also recommended.

The function Φ is defined in formula \ref{eq:phi}.

```
\begin{equation}
\Phi(x)=\prod_{i=1}^n\sin(x_i)\cos(x_i-\frac{1}{3}\pi)\label{eq:phi}
\end{equation}
```

The function Φ is defined in formula (1).

$$\Phi(x)=\prod_{i=1}^n\sin(x_i)\cos(x_i-\frac{1}{3}\pi)$$

(1)

6 Indentations

Below is an example of text indentation:

In addition, seeds have the following property:

```
\begin{itemize}
\item[]
If a seed of clause  $c_T$ , and example  $\{\mathbf{x}\}$  satisfies
 $c_T$  but not  $c$ , then  $\{\mathbf{x}\}$  has at least one attribute
in  $c_T$  that is not in  $c$ .\hfill(\tt*)
\end{itemize}
The procedure below...
```

In addition, seeds have the following property:

If a seed of clause c_T , and example \mathbf{x} satisfies c_T but not c , then \mathbf{x} has at least one attribute in c_T that is not in c .

(*)

The procedure below...

6.1 Bulleted List

Below is an example of a bulleted list:

```
\begin{itemize}
\item for every  $x\in A$  and for...
\item for every  $x_1, x_2$  and for every...
\end{itemize}
```

- for every $x \in A$ and for...
- for every x_1, x_2 and for every...

6.2 Enumerated List

Below is an example of an enumerated list:

```
\begin{enumerate}
\item If one of the following conditions holds:
\begin{enumerate}
\item The first condition.\label{step:1a}
\item The second condition.
\end{enumerate}
\end{enumerate}
\item If  $\frac{n}{n_1}=3$  then in the majority of cases the
assumption may be removed.
\end{enumerate}
```

Let us refer to the first condition by `\ref{step:1a}`.

1. If one of the following conditions holds:
 - a) The first condition.
 - b) The second condition.
2. If $\frac{n}{n_1} = 3$ then in the majority of cases the assumption may be removed.

Let us refer to the first condition by [1.a](#).

7 Algorithms

If you want to include algorithms in your manuscript, please use the `algorithm` package along with the `algorithmic` style. As in other floating environments, please use some of the `[htbp]` (h – here, t – top, b – bottom, p – page) letters right after `\begin{algorithm}` to determine the desired place of your algorithm. Please provide a title with the `\caption{...}` command, and use the `\label{alg:...}` and `\ref{alg:...}` commands if you want to refer to the algorithm in the text, as shown in the following example. If you have the latest `algorithmic` package, you can also refer to any step of the algorithm as shown in the following example.

A general Interval Branch and Bound algorithm is shown in Algorithm~\ref{alg:ibb}. One of the following selection rules is applied in Step \ref{step:selrule}:

```
\begin{algorithm}[ht!]
\caption{ A general interval B\&B algorithm.}
\label{alg:ibb}
\textbf{\underline{Funct}} IBB( $\$S,f\$$ )
\renewcommand{\algorithmiccomment}[1]{\hfill {\it #1}}
\begin{algorithmic}[1]
\STATE Set the working list  $\mathcal{L}_W := \{S\}$  and the final
```

```

list ${\cal L}_Q := ${\cal L}_W
\WHILE{( ${\cal L}_W \neq \emptyset$ )} \label{alg:igoend}
  \STATE Select an interval  $X$  from  ${\cal L}_W$ 
      \label{step:selrule} \COMMENT{Selection rule ~}
  \STATE Compute  $lb(X)$  \COMMENT{Bounding rule ~}
  \IF[Elimination rule]{ $X$  cannot be eliminated}
    \STATE Divide  $X$  into  $X^j, j=1, \dots, p$ , subintervals
      \COMMENT{Division rule ~}
    \FOR{ $j=1, \dots, p$ }
      \IF[Termination rule]{ $X^j$  satisfies the termination
      criterion}
        \STATE Store  $X^j$  in  ${\cal L}_W$ 
      \ELSE
        \STATE Store  $X^j$  in  ${\cal L}_Q$ 
      \ENDIF
    \ENDFOR
  \ENDIF
\ENDWHILE
\STATE \textbf{return}  ${\cal L}_Q$ 
\end{algorithmic}
\end{algorithm}

```

A general Interval Branch and Bound algorithm is shown in Algorithm 1. One of the following selection rules is applied in Step 3.

Algorithm 1 A general interval B&B algorithm.

Funct $IBB(S, f)$

```

1: Set the working list  $\mathcal{L}_W := \{S\}$  and the final list  $\mathcal{L}_Q := \{\}$ 
2: while (  $\mathcal{L}_W \neq \emptyset$  ) do
3:   Select an interval  $X$  from  $\mathcal{L}_W$  Selection rule
4:   Compute  $lb(X)$  Bounding rule
5:   if  $X$  cannot be eliminated then Elimination rule
6:     Divide  $X$  into  $X^j, j = 1, \dots, p$ , subintervals Division rule
7:     for  $j = 1, \dots, p$  do
8:       if  $X^j$  satisfies the termination criterion then Termination rule
9:         Store  $X^j$  in  $\mathcal{L}_W$ 
10:      else
11:        Store  $X^j$  in  $\mathcal{L}_Q$ 
12:      end if
13:    end for
14:  end if
15: end while
16: return  $\mathcal{L}_Q$ 

```

Bibliography

For the bibliography, it is mandatory to use `bibtex` to generate the items to achieve a consistent style! The `actaplain.bst` file defines the style descriptions that can be used like this:

```
\bibliographystyle{actaplain}
\bibliography{actabib}
```

Replace `actabib` with the name of your `.bib` file. Refer to an article [9], a book [5], a technical report [8], a manual [10], an article in a book [6], a chapter in a book [3], an unpublished paper [7], a thesis [2], a proceedings [4], or an article in proceedings [1] using the `\cite` command!

It is necessary to provide detailed description of the referred items. Make sure that only those items are included in the `bibtex` file that are actually cited from your manuscript! Please look up and provide the DOI whenever possible! If not available, provide an URL. BibTeX generates clickable DOI and URL links. Check that they work correctly!

References

- [1] Alefeld, G. Inclusion methods for systems of nonlinear equations — The interval Newton method and modifications. In Herzberger, J., editor, *Topics in Validated Computations*, pages 7–26, Amsterdam, 1994. Elsevier Science Publishers. DOI: [10.1016/B978-0-444-81685-6.50007-6](https://doi.org/10.1016/B978-0-444-81685-6.50007-6).
- [2] Braune, K. D. *Hochgenaue Standardfunktionen für reelle und komplexe Punkte und Intervalle in beliebigen Gleitpunkttrastern*. PhD thesis, Universität Karlsruhe, 1987.
- [3] Correa, R. and Ferreira, A. *Parallel Best-First Branch and Bound in Discrete Optimization: a Framework*. In *IRREGULAR '95, Solving Combinatorial Optimization Problems in Parallel Methods and Techniques*, pages 145–170. Springer, 1996. DOI: [10.1007/BFb0027122](https://doi.org/10.1007/BFb0027122).
- [4] Griewank, A. and Corliss, G. F., editors. *Automatic Differentiation of Algorithms: Theory, Implementation, and Application*, Philadelphia, 1993. SIAM. DOI: [10.1137/1035156](https://doi.org/10.1137/1035156).
- [5] Klatte, R., Kulisch, U., Wiethoff, A., Lawo, C., and Rauch, M. *C-XSC, A C++ Class Library for Extended Scientific Computing*. Springer-Verlag, Berlin, 1993. DOI: [10.1007/978-3-642-58058-1](https://doi.org/10.1007/978-3-642-58058-1).
- [6] Makino, K. and Berz, M. Remainder differential algebras and their applications. In Berz, M., Bischof, C., Corliss, G., and Griewank, A., editors, *Computational Differentiation: Techniques, Applications, and Tools*, pages 63–74. SIAM, Philadelphia, 1996.

- [7] Martínez, J., Casado, L., García, I., Sergeyev, Y., and Tóth, B. On an efficient use of gradient information for accelerating interval global optimization algorithms. Submitted to Numerical Algorithms, 2002.
- [8] Ratz, D. An optimized interval slope arithmetic and its applications. Bericht 4/1996, Institut für Angewandte Mathematik, Universität Karlsruhe, Karlsruhe, Germany, 1996. URL: <http://citeseer.nj.nec.com/ratz96optimized.html>.
- [9] Ratz, D. A nonsmooth global optimization technique using slopes, the one dimensional case. *Journal of Global Optimization*, 14(4):365–393, 1999. DOI: [10.1023/A:1008391326993](https://doi.org/10.1023/A:1008391326993).
- [10] Smith, T. *Cray T3D System Architecture Overview*. Cray Research, 1993. URL: ftp://ftp.cray.com/product-info/mpp/T3D_Architecture_Over/T3D.overview.html.