Style File
for Authors Coding with LaTeX

Lecture Notes
in Computer Science
Version 1.1

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Acceptable formats of your disk/magnetic tape and output:

The following formats are acceptable: 5.25″ diskette MS-DOS, 5.25″ CP/M, 3.5″ diskette MS-DOS, 3.5″ diskette Apple MacIntosh, 9-track 1600 bpi magnetic tape VAX/VMS, 9-track 1600 bpi magnetic tape ANSI with label, SUN-Streamer Tape.

Once you have completed your work using this macro package, please submit your own printout of the *final version together with the disk or magnetic tape*, containing your LaTeX input (source) file und the final DVI-file and make sure that the text is *identical in both cases.*

This macro package, as well as all other macro packages and style files that Springer distributes, are also available through our mailserver

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1 Introduction

Authors wishing to code their contribution with LaTeX, as well as those who have already coded with LaTeX, will be provided with a style file that will give the text the desired layout. Authors are requested to adhere strictly to these instructions; *the style file must not be changed.*

The text output area is automatically set within an area of 12.2 cm horizontally and 19.3 cm vertically.

If you are already familiar with LaTeX, then the LLNCS style file should not give you any major difficulties. This style file will change the layout to the required LLNCS style (it will for instance define the layout of `\section`). We had to invent some extra commands, which are not provided by LaTeX (e.g. `\institute`, see also Sect. **??**)

For the main body of the paper (the text) you should use the commands of the standard LaTeX "article" style. Even if you are familiar with those commands, we urge you to read this entire documentation thoroughly. It contains many suggestions on how to use our commands properly; thus your paper will be formatted exactly to LLNCS standard. For the input of the references at the end of your contribution, please follow our instructions given in Sect. **??** References.

The majority of these hints are not specific for LLNCS; they may improve your use of LaTeX in general. Furthermore, the documentation provides suggestions about the proper editing and use of the input files (capitalization, abbreviation etc.) (see Sect. **??** How to Edit Your Input File).

2 How to Proceed

Please insert the enclosed diskette or tape into your computer. You will find the following files:

llncs.doc	General instructions (this document), *llncs.doc* means llncs latex documentation
llncs.dem	An example showing how to code the text
llncs.sty	Style file to invoke LaTeX

You have to run each file twice with: `latex file.name`.

2.1 How to Invoke the LLNCS Style File

The LLNCS style file is an adaptation of the LaTeX "article" style. Therefore you may use all "article" style commands to prepare your manuscript. LLNCS style is invoked by replacing "article" by "llncs" in the first line of your document:

```
\documentstyle{llncs}
%
\begin{document}
  <Your contribution>
\end{document}
```

2.2 Contributions Already Coded with LaTeX without the LLNCS Style File

If your file is already coded with LaTeX you can easily adapt it a posteriori to LLNCS style.

Please refrain from using any LaTeX or TeX commands that affect the layout or formatting of your document (i.e. commands like `\textheight`, `\vspace`, `\hoffset` etc.). There may nevertheless be exceptional occasions on which to use some of them.

The LLNCS style has been carefully designed to produce the right layout from your LaTeX input. If there is anything specific you would like to do and for which the style file does not provide a command, *please contact us.*

3 General Rules for Coding Formulas

With mathematical formulas you may proceed as described in Sect. 3.3 of the *LaTeX User's Guide & Reference Manual* by Leslie Lamport (1986), Addison-Wesley Publishing Company, Reading, Mass.

Equations are automatically numbered sequentially throughout your contribution using arabic numerals in parentheses on the right-hand side.

When you are working in math mode everything is typeset in italics. Sometimes you need to insert non-mathematical elements (e.g. words or phrases). Such insertions should be coded in roman (with `\mbox`) as illustrated in the following example:

Sample Input

```
\begin{equation}
  \left(\frac{a^{2} + b^{2}}{c^{3}} \right) = 1 \quad
  \mbox{ if } c\neq 0 \mbox{ and if } a,b,c\in \bbbr \enspace .
\end{equation}
```

Sample Output

$$\left(\frac{a^2 + b^2}{c^3}\right) = 1 \quad \text{if } c \neq 0 \text{ and if } a, b, c \in \mathbb{R} \ . \tag{1}$$

If you wish to start a new paragraph immediately after a displayed equation, insert a blank line so as to produce the required indentation. If there is no new paragraph either do not insert a blank line or code `\noindent` immediately before continuing the text. Titles have no end punctuation.

Please punctuate a displayed equation in the same way as other ordinary text but with an `\enspace` before end punctuation.

Note that the sizes of the parentheses or other delimiter symbols used in equations should ideally match the height of the formulas being enclosed. This is automatically taken care of by the following LaTeX commands:

`\left(` or `\left[` and `\right)` or `\right]`.

3.1 Italic and Roman Type in Math Mode

a) In math mode TeX and LaTeX treat all letters as though they were mathematical or physical variables, hence they are typeset in italics. However, for certain components of formulas, like short texts, this would be incorrect and therefore coding in roman is required. Roman should also be used for subscripts and superscripts *in formulas* where these are merely labels and not in themselves variables, e.g. $T_{\rm eff}$ not T_{eff}, $T_{\rm K}$ not T_K (K = Kelvin), $m_{\rm e}$ not m_e (e = electron). However, do not code for roman if the sub/superscripts represent variables, e.g. $\sum_{i=1}^{n} a_i$.
b) Please ensure that *physical units* (e.g. pc, erg s^{-1} K, cm^{-3}, W m^{-2} Hz^{-1}, m kg s^{-2} A^{-2}) and *abbreviations* such as Ord, Var, GL, SL, sgn, const. are always set in roman type. To ensure this use the `\rm` command: `{\rm Hz}`. On p. 46 of the *LaTeX User's Guide & Reference Manual* by Leslie Lamport you will find the names of common mathematical functions, such as log, sin, exp, max and sup. These should be coded as `\log`, `\sin`, `\exp`, `\max`, `\sup` and will appear in roman.
c) Chemical symbols and formulas should be coded for roman, e.g. Fe not Fe, H_2O not H_2O.
d) Familiar foreign words and phrases, e.g. et al., a priori, in situ, bremsstrahlung, eigenvalues should not be italicized.

4 How to Edit Your Input (Source) File

4.1 Headings

All words in headings should be capitalized except for conjunctions, prepositions (e.g. on, of, by, and, or, but, from, with, without, under) and definite and indefinite articles (the, a, an) unless they appear at the beginning. Formula letters must be typeset as in the text.

4.2 Capitalization and Non-capitalization

a) The following should always be capitalized:
   - Headings (see preceding Sect. 4.1)
   - Abbreviations and expressions in the text such as Fig(s)., Table(s), Sect(s)., Chap(s)., Theorem, Corollary, Definition etc. when used with numbers, e.g. Fig. 3, Table 1, Theorem 2.

   Please follow the special rules in Sect. 4.3 for referring to equations.
b) The following should *not* be capitalized:
   - The words figure(s), table(s), equation(s), theorem(s) in the text when used without an accompanying number
   - Figure legends and table captions except for names and abbreviations.

4.3 Abbreviation of Words

a) The following *should* be abbreviated when they appear in running text *unless* they come at the beginning of a sentence: Chap., Sect., Fig.; e.g. The results are depicted in Fig. 5. Figure 9 reveals that ....
Please note: Equations should usually be referred to solely by their number in parentheses: e.g. (14). However, when the reference comes at the beginning of a sentence, the unabbreviated word "Equation" should be used: e.g. Equation (14) is very important. However, (15) makes it clear that ....
b) If abbreviations of names or concepts are used throughout the text, they should be defined at first occurrence, e.g. Plurisubharmonic (PSH) Functions, Strong Optimization (SOPT) Problem.

5 How to Code the Beginning of Your Contribution

The title of your contribution should be coded as follows:

```
\title{<Your contribution title>}
```

All words in titles should be capitalized except for conjunctions, prepositions (e.g. on, of, by, and, or, but, from, with, without, under) and definite and indefinite articles (the, a, an) unless they appear at the beginning. Formula letters must be typeset as in the text. Titles have no end punctuation.

If a long `\title` must be divided please use the code \\ (for new line).

Now the name(s) of the authors(s) must be given:

```
\author{<author(s) name(s)>}
```

Numbers referring to different addresses are to be attached to each author. If you have done this correctly, the entry now reads, for example:

```
\author{Ivar Ekeland\inst{1} and Roger Temam\inst{2}}
```

The first name[1] is followed by the surname.

If there is more than one author, the order is up to you. However, if there are more than two authors, you must separate the names by commas. If the authors have different affiliations, each name has to be followed by:

```
\inst{<no>}
```

[1] Other initials are optional and may be inserted if this is the usual way of writing your name, e.g. Alfred J. Holmes, E. Henry Green.

Next the address(es) of institute(s), company etc. is (are) required. If there is more than one address, the entries are numbered automatically with `\and`, in the order in which you type them. Please make sure that the numbers match those placed next to to the authors' names.

```
\institute{<name of an institute>
\and <name of the next institute>
\and <name of the next institute>}
```

Unlike usual LaTeX the `\and` command is used with the `\institute` and not with the `\author` command.

If footnotes are needed in `\title` please code (immediately after the word where the footnote indicator should be placed):

```
\thanks{<text>}
```

`\thanks` may only appear in `\title`, `\author` and `\institute` (see below) to footnote anything.

The command

```
\maketitle
```

formats the complete heading of your article. If you leave it out the work done so far will produce **no** text, see *Sample Input* on p. **??**.

Then the abstract should follow. Please refer to the demonstration file `llncs.dem` for an example or to the *Sample Input* like above.

6 How to Code Your Text

The contribution title and all headings should be capitalized except for conjunctions, prepositions (e.g. on, of, by, and, or, but, from, with, without, under) and definite and indefinite articles (the, a, an) unless they appear at the beginning. Formula letters must be typeset as in the text.

Headings will be automatically numbered by the following codes.

Sample Input

```
\section{This is a First-Order Title}
\subsection{This is a Second-Order Title}
\subsubsection{This is a Third-Order Title.}
\paragraph{This is a Fourth-Order Title.}
```

`\section` and `\subsection` have no end punctuation.
`\subsubsection` and `\paragraph` need to be punctuated at the end.

In addition to the above-mentioned headings your text may be structured by subsections indicated by run-in headings (theorem-like environments). All the theorem-like environments are numbered automatically throughout the sections of your file. If you call lemma once, this will be numbered 1; if corollary follows, this will be numbered 2; if you then call lemma again, this will be numbered 3.

But in case you want to reset this counter at 1 in each section, please give the document style option `envcountreset`:

```
\documentstyle[envcountreset]{llncs}
```

The following possibilities for run-in headings are available:

`\begin{lemma} Text of the lemma \end{lemma}` (see Output Sample 1)

`\begin{lemma}[additional explanation of lemma] Text of lemma \end{lemma}` (see Output Sample 2)

`\begin{lemma}(overriding automatic numbering.) Text of the lemma \end{lemma}` (see Output Sample 3)

`\begin{lemma}(x)[additional explanation of lemma] Text of lemma\end{lemma}` (see Output Sample 4)

`\begin{lemma}* Text of lemma \end{lemma}` (see Output Sample 5)

`\begin{lemma}*[additional explanation of lemma] Text of lemma\end{lemma}` (see Output Sample 6)

Output Sample 1

Lemma 1. *Text of lemma*

Output Sample 2

Lemma 2 additional explanation of lemma. *Text of lemma*

Output Sample 3

Lemma overriding automatic numbering. *Text of lemma*

Output Sample 4

Lemma x (additional explanation of lemma). *Text of lemma*

Output Sample 5

Lemma. *Text of lemma*

Output Sample 6

Lemma additional explanation of lemma. *Text of lemma*

The following variety of run-in headings are at your disposal:

a) **Bold** run-in headings with italicized text as built-in environments:

```
\begin{proposition} <text> \end{proposition}
\begin{corollary} <text> \end{corollary}
\begin{lemma} <text> \end{lemma}
\begin{theorem} <text> \end{theorem}
```

b) The following must generally appear as *italic* run-in heading:

```
\begin{proof} <text>    \qed    \end{proof}
```

c) Further *italic* or **bold** run-in headings may also occur:

```
\begin{definition} <text> \end{definition}
\begin{example} <text> \end{example}
\begin{remark} <text> \end{remark}
\begin{exercise} <text> \end{exercise}
\begin{problem} <text> \end{problem}
\begin{solution} <text> \end{solution}
\begin{note} <text> \end{note}
\begin{question} <text> \end{question}
```

Defining Your Own Environments. You can define additional environments using the command `\newstytheorem` which has five parameters. The first is the name your environment should have (e.g. `conjecture`). After this follows the font family used for this heading (please use only `\bf` for bold or `\it` for italic) and the font family to use for the text of this new environment (e.g. `\it` or `\rm`). Then the name of an already known environment should be given in brackets (e.g. `[theorem]`). Your new environment will be numbered like the old one. Finally comes the real text of the new run-in heading (e.g. `Conjecture`).
Sample definition:

```
\newstytheorem{conjecture}{\bf}{\it}[theorem]{Conjecture}
```

Use of that definition:

```
\begin{conjecture} <text> \end{conjecture}
```

e.g.

```
\begin{conjecture} It is clear that ...\end{conjecture}
```

Its output:

Conjecture 3. *It is clear that ...*

Sample Input

```
\title{Hamiltonian Mechanics}

\author{Ivar Ekeland\inst{1} and Roger Temam\inst{2}}

\institute{Princeton University, Princeton NJ 08544, USA
\and
Universit\'{e} de Paris-Sud,
Laboratoire d'Analyse Num\'{e}rique, B\^{a}timent 425,\\
F-91405 Orsay Cedex, France}
```

```
\maketitle
%
\begin{abstract}
This paragraph shall summarize the contents of the paper
in short terms.
\end{abstract}
%
\section{Fixed-Period Problems: The Sublinear Case}
%
With this chapter, the preliminaries are over, and we begin the
search for periodic solutions \dots
%
\subsection{Autonomous Systems}
%
In this section we will consider the case when the Hamiltonian
$H(x)$ \dots
%
\subsubsection*{The General Case: Nontriviality.}
%
We assume that $H$ is
$\left(A_{\infty}, B_{\infty}\right)$-subqua\-dra\-tic
at infinity, for some constant \dots
%
\paragraph{Notes and Comments.}
The first results on subharmonics were \dots
%
\begin{proposition}
Assume $H'(0)=0$ and $ H(0)=0$. Set \dots
\end{proposition}
\begin{proof}[of proposition]
Condition (8) means that, for every $\delta'>\delta$, there is
some $\varepsilon>0$ such that \dots \qed
\end{proof}
%
\begin{example}[\rm (External forcing)]
Consider the system \dots
\end{example}
\begin{corollary}
Assume $H$ is $C^{2}$ and
$\left(a_{\infty}, b_{\infty}\right)$-subquadratic
at infinity. Let \dots
\end{corollary}
```

```
\begin{lemma}
Assume that $H$ is $C^{2}$ on $\bbbr^{2n}\backslash \{0\}$
and that $H''(x)$ is \dots
\end{lemma}
\begin{theorem}[(Ghoussoub-Preiss)]
Let $X$ be a Banach Space and $\Phi:X\to\bbbr$ \dots
\end{theorem}
\begin{definition}
We shall say that a $C^{1}$ function $\Phi:X\to\bbbr$
satisfies \dots
\end{definition}
```

Sample Output (follows on the next page together with examples of the above run-in headings)

Hamiltonian Mechanics

Ivar Ekeland[1] and Roger Temam[2]

[1] Princeton University, Princeton NJ 08544, USA
[2] Université de Paris-Sud, Laboratoire d'Analyse Numérique, Bâtiment 425, F-91405 Orsay Cedex, France

Abstract. This paragraph shall summarize the contents of the paper in short terms.

1 Fixed-Period Problems: The Sublinear Case

With this chapter, the preliminaries are over, and we begin the search for periodic solutions ...

1.1 Autonomous Systems

In this section we will consider the case when the Hamiltonian $H(x)$ ...

The General Case: Nontriviality. We assume that H is (A_∞, B_∞)-subquadratic at infinity, for some constant ...

Notes and Comments. The first results on subharmonics were ...

Proposition 4. *Assume $H'(0) = 0$ and $H(0) = 0$. Set ...*

Proof of proposition. Condition (8) means that, for every $\delta' > \delta$, there is some $\varepsilon > 0$ such that ... □

Example 1 (External forcing). Consider the system ...

Corollary 5. *Assume H is C^2 and (a_∞, b_∞)-subquadratic at infinity. Let ...*

Lemma 6. *Assume that H is C^2 on $\mathbb{R}^{2n}\backslash\{0\}$ and that $H''(x)$ is ...*

Theorem 7 (Ghoussoub-Preiss). *Let X be a Banach Space and $\Phi : X \to \mathbb{R}$ ...*

Definition 8. We shall say that a C^1 function $\Phi : X \to \mathbb{R}$ satisfies ...

7 Fine Tuning of the Text

The following should be used to improve the readability of the text:

`\,`	a thin space, e.g. between numbers or between units and numbers; a line division will not be made following this space
`--`	en dash; two strokes, without a space at either end
`␣--␣`	en dash; two strokes, with a space at either end
`-`	hyphen; one stroke, no space at either end
`$-$`	minus, in the text *only*

Input

```
21\,$^{\circ}$C etc.,
Dr h.\,c.\,Rockefellar-Smith \dots
20,000\,km and  Prof.\,Dr Mallory \dots
1950--1985 \dots
this -- written on a computer -- is now printed
$-30$\,K \dots
```

Output

21 °C etc., Dr h. c. Rockefellar-Smith ...
20,000 km and Prof. Dr Mallory ...
1950–1985 ...
this – written on a computer – is now printed
−30 K ...

8 Special Typefaces

Normal type (roman) need not be coded. *Italic* (not *slanted*) or, if necessary, **boldface** should be used for emphasis in the text.

`{\it Text}`	*Italicized Text*
`{\em Text}`	*Emphasized Text* *If you would like to emphasize a* definition *within an italicized text (e.g. of a* theorem*) you should code the expression to be emphasized by* `\em`.
`{\bf Text}`	**Important Text**
`\vec{Symbol}`	Vectors may only appear in math mode. The default LaTeX vector symbol has been adapted to LLNCS conventions. `$\vec{A \times B\cdot C}` yields $\vec{A \times B\cdot C}$ `$\vec{A}^{T} \otimes \vec{B} \otimes \vec{\hat{D}}$` yields $\vec{A}^{T} \otimes \vec{B} \otimes \vec{\hat{D}}$

9 Footnotes

Footnotes within the text should be coded:

```
\footnote{Text}
```

Sample Input

Text with a footnote`\footnote{The footnote is automatically numbered.}` and text continues ...

Sample Output

Text with a footnote[3] and text continues ...

10 Lists

Please code lists as described below:

Sample Input

```
\begin{enumerate}
  \item First item
  \item Second item
  \begin{enumerate}
    \item First nested item
    \item Second nested item
  \end{enumerate}
  \item Third item
\end{enumerate}
```

Sample Output

1. First item
2. Second item
   (a) First nested item
   (b) Second nested item
3. Third item

11 Figures

Figure legends should be inserted after (not in) the paragraph in which the figure is first mentioned. They will be numbered automatically.

The figures (line drawings and those containing halftone inserts as well as halftone figures) *should not be pasted into your laserprinter output.* They should be enclosed separately in camera-ready form (original artwork, glossy prints, photographs and/or slides). The lettering should be suitable for reproduction, and after reduction the height of capital letters should be at least 1.8 mm and not more than 2.5 mm. Check that lines and other details are uniformly black and that the lettering on figures is clearly legible.

To leave the desired amount of space for the height of your figures, please use the coding described below. As can be seen in the output, we will automatically

[3] The footnote is automatically numbered.

provide 1 cm space above and below the figure, so that you should only leave the space equivalent to the size of the figure itself. Please note that "x" in the following coding stands for the actual height of the figure:

```
\begin{figure}
\vspace{x cm}
\caption[ ]{...text of caption...}          (Do type [ ])
\end{figure}
```

Sample Input

```
\begin{figure}
\vspace{2.5cm}
\caption{This is the caption of the figure displaying a white
eagle and a white horse on a snow field}
\end{figure}
```

Sample Output

Fig. 1. This is the caption of the figure displaying a white eagle and a white horse on a snow field

12 Tables

Table captions should be treated in the same way as figure legends, except that the table captions appear *above* the tables. The tables will be numbered automatically.

12.1 Tables Coded with LaTeX

Please use the following coding:

Sample Input

```
\begin{table}
\caption{This is the example table taken out of {\it The
\TeX{}book,} p.\,246}
```

```
\vspace{2pt}
\begin{tabular}{r@{\quad}rl}
\hline
\multicolumn{1}{l}{\rule{0pt}{12pt}
               Year}&\multicolumn{2}{l}{World population}\\[2pt]
\hline\rule{0pt}{12pt}
8000 B.C.  &     5,000,000& \\
  50 A.D.  &   200,000,000& \\
1650 A.D.  &   500,000,000& \\
1945 A.D.  & 2,300,000,000& \\
1980 A.D.  & 4,400,000,000& \\[2pt]
\hline
\end{tabular}
\end{table}

Before continuing your text you need an empty line. \dots
```

Sample Output

Table 1. This is the example table taken out of *The TEXbook,* p. 246

Year	World population
8000 B.C.	5,000,000
50 A.D.	200,000,000
1650 A.D.	500,000,000
1945 A.D.	2,300,000,000
1980 A.D.	4,400,000,000

Before continuing your text you need an empty line. ...

For further information you will find a complete description of the tabular environment on p. 63 ff. and p. 182 of the *LaTeX User's Guide & Reference Manual* by Leslie Lamport.

12.2 Tables Not Coded with LaTeX

If you do not wish to code your table using LaTeX but prefer to have it reproduced separately, proceed as for figures and use the following coding:

Sample Input

```
\begin{table}
\caption{text of your caption}
\vspace{x cm}     % the actual height needed for your table
\end{table}
```

12.3 Signs and Characters

Special Signs. You may need to use special signs. The available ones are listed in the *LaTeX User's Guide & Reference Manual* by Leslie Lamport, pp. 44 ff. We have created further symbols for math mode (enclosed in $):

`\grole`	yields	$\gtrless$	`\getsto`	yields	$\leftrightarrows$
`\lid`	yields	$\leqq$	`\gid`	yields	$\geqq$

Gothic (Fraktur). If gothic letters are *necessary*, please use those of the relevant $\mathcal{AMS}$-TEX alphabet which are available from the American Mathematical Society.

In LaTeX only the following gothic letters are available: `$\Re$` yields $\Re$ and `$\Im$` yields $\Im$. These should *not* be used when you need gothic letters for your contribution. Use $\mathcal{AMS}$-TEX gothic as explained above. For the real and the imaginary parts of a complex number within math mode you should use instead: `$\rm Re$` (which yields Re) or `$\rm Im$` (which yields Im).

Script. For script capitals use the coding

`$\cal AB$` which yields $\mathcal{AB}$

(see p. 43 of the LaTeX book).

Special Roman. If you need other symbols than those below, you could use the blackboard bold characters of $\mathcal{AMS}$-TEX, but there might arise capacity problems in loading additional $\mathcal{AMS}$-TEX fonts. Therefore we created the blackboard bold characters listed below. Some of them are not esthetically satisfactory. This need not deter you from using them: in the final printed form they will be replaced by the well-designed MT (monotype) characters of the phototypesetting machine.

`\bbbc`	(complex numbers)	yields $\mathbb{C}$	`\bbbf`	(blackboard bold F)	yields $\mathbb{F}$
`\bbbh`	(blackboard bold H)	yields $\mathbb{H}$	`\bbbk`	(blackboard bold K)	yields $\mathbb{K}$
`\bbbm`	(blackboard bold M)	yields $\mathbb{M}$	`\bbbn`	(natural numbers N)	yields $\mathbb{N}$
`\bbbp`	(blackboard bold P)	yields $\mathbb{P}$	`\bbbq`	(rational numbers)	yields $\mathbb{Q}$
`\bbbr`	(real numbers)	yields $\mathbb{R}$	`\bbbs`	(blackboard bold S)	yields $\mathbb{S}$
`\bbbt`	(blackboard bold T)	yields $\mathbb{T}$	`\bbbz`	(whole numbers)	yields $\mathbb{Z}$
`\bbbone`	(symbol one)	yields $\mathbb{1}$			

$$\mathbb{C}^{\mathbb{C}^{\mathbb{C}}} \otimes \mathbb{F}_{\mathbb{F}_{\mathbb{F}}} \otimes \mathbb{H}_{\mathbb{H}_{\mathbb{H}}} \otimes \mathbb{K}_{\mathbb{K}_{\mathbb{K}}} \otimes \mathbb{M}^{\mathbb{M}^{\mathbb{M}}} \otimes \mathbb{N}_{\mathbb{N}_{\mathbb{N}}} \otimes \mathbb{P}^{\mathbb{P}^{\mathbb{P}}}$$
$$\otimes \mathbb{Q}_{\mathbb{Q}_{\mathbb{Q}}} \otimes \mathbb{R}^{\mathbb{R}^{\mathbb{R}}} \otimes \mathbb{S}^{\mathbb{S}_{\mathbb{S}}} \otimes \mathbb{T}^{\mathbb{T}^{\mathbb{T}}} \otimes \mathbb{Z} \otimes \mathbb{1}^{\mathbb{1}_{\mathbb{1}}}$$

Sans Serif. Using our macros you can also choose this font family; use the command `\sf` for sans serif (like `\it` for *italic style*).

13 References

There are three reference systems available; only one, of course, should be used for your contribution. With each system (by number only, by letter-number or by author-year) a reference list containing all citations in the text, should be included at the end of your contribution placing the LaTeX environment `thebibliography` there. For an overall information on that environment see the *LaTeX User's Guide & Reference Manual* by Leslie Lamport, p. 73.

13.1 References by Letter-Number or by Number Only

References are cited in the text – using the `\cite` command of LaTeX – by number or by letter-number in square brackets, e.g. [1] or [E1, S2], [P1], according to your use of the `\bibitem` command in the `thebibliography` environment. The coding is as follows: if you choose your own label for the sources by giving an optional argument to the `\bibitem` command the citations in the text are marked with the label you supplied. Otherwise a simple numbering is done, which is preferred.

```
The results in this section are a refined version
of \cite{clar:eke}; the minimality result of Proposition~14
was the first of its kind.
```

The above input produces the citation: "... refined version of [CE1]; the minimality...". Then the `\bibitem` entry of the `thebibliography` environment should read:

```
\begin{thebibliography}{[MT1]}
..
..
\bibitem[CE1]{clar:eke}
Clarke, F., Ekeland, I.:
Nonlinear oscillations and boundary-value problems for
Hamiltonian systems.
Arch. Rat. Mech. Anal. {\bf 78} (1982) 315--333
..
..
\end{thebibliography}
```

The complete bibliography looks like this:

References

[CE1] Clarke, F., Ekeland, I.: Nonlinear oscillations and boundary-value problems for Hamiltonian systems. Arch. Rat. Mech. Anal. **78** (1982) 315–333

[CE2] Clarke, F., Ekeland, I.: Solutions périodiques, du période donnée, des équations hamiltoniennes. Note CRAS Paris **287** (1978) 1013–1015

[MT1] Michalek, R., Tarantello, G.: Subharmonic solutions with prescribed minimal period for nonautonomous Hamiltonian systems. J. Diff. Eq. **72** (1988) 28–55
[Ta1] Tarantello, G.: Subharmonic solutions for Hamiltonian systems via a $\mathbb{Z}_p$ pseudoindex theory. Annali di Matematica Pura (to appear)
[Ra1] Rabinowitz, P.: On subharmonic solutions of a Hamiltonian system. Comm. Pure Appl. Math. **33** (1980) 609–633

Number-Only System. For this preferred system do not use the optional argument in the `\bibitem` command: then, only numbers will appear for the citations in the text (enclosed in square brackets) as well as for the marks in your bibliography (here the number is only end-punctuated without square brackets).

```
\begin{thebibliography}{1}
\bibitem {clar:eke}
Clarke, F., Ekeland, I.:
Nonlinear oscillations and boundary-value problems for
Hamiltonian systems.
Arch. Rat. Mech. Anal. {\bf 78} (1982) 315--333
\end{thebibliography}
```

13.2 Author-Year System

References are cited in the text by name and year in parentheses and should look as follows: (Smith 1970, 1980), (Ekeland et al. 1985, Theorem 2), (Jones and Jaffe 1986; Farrow 1988, Chap. 2). If the name is part of the sentence only the year may appear in parentheses, e.g. Ekeland et al. (1985, Sect. 2.1) The reference list should contain all citations occurring in the text, ordered alphabetically by surname (with initials following). If there are several works by the same author(s) the references should be listed in the appropriate order indicated below:

a) One author: list works chronologically;
b) Author and same co-author(s): list works chronologically;
c) Author and different co-authors: list works alphabetically according to co-authors.

If there are several works by the same author(s) and in the same year, but which are cited separately, they should be distinguished by the use of "a", "b" etc., e.g. (Smith 1982a), (Ekeland et al. 1982b).

How to Code Author-Year System. If you want to use this system you have to specify in `documentstyle` the option `[citeauthoryear]`, like:

```
\documentstyle[citeauthoryear]{llncs}
```

Write your citations in the text explicitly except for the year, leaving that up to LaTeX with the `\cite` command. Then give only the appropriate year as the optional argument (i.e. the label in square brackets) with the `\bibitem`

command(s).

Sample Input

```
The results in this section are a refined version
of Clarke and Ekeland (\cite{clar:eke}); the minimality result of
Proposition~14 was the first of its kind.
```

The above input produces the citation: "... refined version of Clarke and Ekeland (1982); the minimality...". Then the `\bibitem` entry of the `thebibliography` environment should read:

```
\begin{thebibliography}{}  % (do not forget {})
..
..
\bibitem[1982]{clar:eke}
Clarke, F., Ekeland, I.:
Nonlinear oscillations and boundary-value problems for
Hamiltonian systems.
Arch. Rat. Mech. Anal. {\bf 78} (1982) 315--333
..
..
\end{thebibliography}
```

Sample Output

References

Clarke, F., Ekeland, I.: Nonlinear oscillations and boundary-value problems for Hamiltonian systems. Arch. Rat. Mech. Anal. **78** (1982) 315–333