

Основи на L^AT_EX

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5 февруари 2014 г.

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Литература:

- T. Oetiker *et al*, *The not so Short Introduction to L^AT_EX*, version 5.01 (2011).
Превод от Ст. Караколева, *Не много кратко въведение в L^AT_EX, версия 4.04 (2004)*.
- G. Gonzato, *L^AT_EX for Word Processor Users, version 1.0.6* (2003).
- P. Flynn, *A beginner's introduction to typesetting with L^AT_EX* (2003).
- ...

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Дисертация (около 100 страници)

- Title page
- Foreword
- Table of contents
- Chapter 1
- ...
- Chapter $i - 1$
- Chapter i
- Chapter $i + 1$
- ...
- Chapter n
- Appendices
- Bibliography

Дисертация (около 100 страници)

- Title page
- Foreword
- **Table of contents**
- Chapter 1
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- Chapter $i - 1$
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- Chapter $i + 1$
- ...
- Chapter n
- Appendices
- **Bibliography**

Проблеми с фигури, формули (ако има такива) и особено с литературата и съдържанието.

WYSIWYG editors (MS word, LO writer, OO writer, ...)

- May loose logical structures
- Automatic numbering & cross-referencing hard to achieve (mostly completed by hand)
- Different results on different computers & versions
- No control over the document
- **Large in size files**

- Result is machine (hardware & software) independent
- Document control
- Automation of cross-referencing, bibliographies, table of contents
- Global changes (formatting, bibliography style ...) are easily implemented

Pros:

- Result is machine (hardware & software) independent
- Document control
- Automation of cross-referencing, bibliographies, table of contents
- Global changes (formatting, bibliography style ...) are easily implemented

Cons:

- Not easy to learn
- Complex formatting may take more time than WYSIWYG editors

- L^AT_EX – a **markup language**
- Editing in text files
- L^AT_EX decides how to format the document
- Output – a device-independent file (DVI) or a PDF

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The very first document

- Input

```
\documentclass{article}  
  
\begin{document}  
  
Hello World!  
  
% This is a comment.  
  
\end{document}
```

- Output

Hello World!

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```
\documentclass{article}
```

```
...
```

```
\begin{document}
```

```
Come up and C++ me some time.
```

```
You won't regret it!
```


```
$$
```

```
ax2+bx+c=0
```

```
$$
```

```
% This is a comment.
```

```
\end{document}
```



Preambles



Body


```
\documentclass{article}
```

```
...
```

```
\begin{document}
```

```
Come up and C++ me some time.
```

```
You won't regret it!
```

```
$$
```

```
ax^2+bx+c=0
```

```
$$
```

```
% This is a comment.
```

```
\end{document}
```

Preambles

Body



```
Come up and C++ me some time.
```

```
You won't regret it!
```

$$ax^2 + bx + c = 0$$

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How to write the input file and eventually get the correct output?

- Good L^AT_EX editor
 - LyX – nearly WYSIWYG, **open source**
 - ...
 - Texmaker
 - T_EXstudio, LaTeX made comfortable;
 - Winedt – **commercial**
- T_EX (L^AT_EX) typesetting system
 - MiK_TE_X ...typesetting beautiful documents...;
 - T_EXLive;

How to write the input file and eventually get the correct output?

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<http://texstudio.sourceforge.net>
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<http://miktex.org>
 - **T_EXLive;**
<https://www.tug.org/texlive>

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T_EXstudio screenshot – I

The screenshot shows the TeXstudio interface with a LaTeX document open. The document contains a bibliography section with several entries, including references to works by Fujita, Castro Neto, Chamati, Gross, Shankar, Bogolyubov Jr., and Perera. A code editor window is overlaid on the document, showing the LaTeX code for an equation environment. The code includes comments and the `equation` command. The preview window on the right shows the rendered output, including a list of references and a mathematical equation (0.1) for the spinor ψ .

Code Editor:

```

47
48 \diagrams
49 \cite{fujita_bound_1995}
50
51 \cite{castro_neto_thermodynamics_1993,chubukov_theory_1994,sachdev_quantum_2011}
52
53 \cite{chamati_quantum_2011,moshe_quantum_2009,cayssol_introduction_2013}
54
55 \cite{gross_dynamical_1974,witten_chiral_1970,witten_properties_1978,witten_1984}
56
57 \cite{shankar_renormalization_group_1994,kleinert_two_1998}
58
59 \cite{bogolyubov_jr_classes_1984,sheehy_quantum_2007}
60
61 - \begin{equation} \label{proham}
62 \quad \mathcal{H} = \int d^2x \left[ \psi^\dagger \left( -\frac{\hbar^2 \nabla^2}{2m} + V(\mathbf{r}) \right) \psi + \psi^\dagger \psi \right]
63 - \quad \text{equation}
64 + \gamma_{\text{penn}} \frac{1}{2} \int d^2x \psi^\dagger \psi \psi^\dagger \psi
65 - \quad \text{each formula}
66 \quad \text{end{equation}}
67 \end{equation} The equation environment centres your equation on the
68 page and places the equation number in the right margin.
69 \end{equation}
70 \end{equation}
71 \end{equation}
72 \end{equation}
73 \end{equation}
74 \end{equation}
75 \end{equation}
76 \end{equation}
77 \end{equation}
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93 \end{equation}
94 \end{equation}
95 \end{equation}
96 \end{equation}
97 \end{equation}
98 \end{equation}
99 \end{equation}
100 \end{equation}

```

Preview Window:

1. Compare two examples
2. Diagrammatic technique
3. Correlation function
(Gracey, 1994b, 1999)
(Polini *et al.*, 2013)
(Marbar, 2007)
(Alhalla *et al.*, 2001; Economou, 2006; Negele and Orland, 1998; Wall and Carr, 2013; Zee, 2010)
(Nambu and Jona-Lasinio, 1961a,b)
Diagrams (Fujita and Sekiguchi, 1995)
(Castro Neto and Fradkin, 1993; Chubukov *et al.*, 1994; Rañçon *et al.*, 2013; Sachdev, 2011)
(Cayssol, 2013; Chamati and Tonchev, 2011; Moshe and Zinn-Justin, 2003)
(Gross and Neveu, 1974; Witten, 1978a,b, 1980)
(Kleinert and Babaev, 1998; Shankar, 1994)
(Bogolyubov (Jr) *et al.*, 1984; Sheehy and Schmalhan, 2007)

$$\mathcal{H} = \int d^2x \left[-\psi^\dagger \left(\nabla^2 + \frac{\partial^2}{\partial x_j^2} \right) \psi + \frac{g^2}{2N} (\psi^\dagger \psi)^2 \right], \quad (0.1)$$

ψ - spinor; $\bar{\psi} = \psi^\dagger \gamma^0$ - adjoint spinor
(Peira *et al.*, 1999)
(Drut *et al.*, 2010; Gracey, 1994a; Herbut, 2006; Vasil'ev *et al.*, 1993)

L. GENERAL REVIEW

The Gross-Neveu model (Gross and Neveu, 1974) is a well-known two-dimensional theory with four-fermion interactions which is asymptotically free. The Fermion field has N components. The model was originally considered in the ϵ expansion. The massless formulations, with discrete or continuous symmetry, have been extensively studied for zero or for finite temperature.

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T_EXstudio screenshot – II

The screenshot shows the TeXstudio interface with a LaTeX document open. The main window displays the source code, which includes a section on the Gross-Neveu model and its expansion. The code uses `\section`, `\subsection`, `\begin{equation}`, and `\end{equation}` commands. A preview window on the right shows the rendered output, including a table of contents and a list of references. A message log at the bottom shows the compilation process.

Code Snippets:

```

75 \section{General review}
76 The Gross-Neveu model \cite{gross_dynamical_1974} is a well-known
77 two-dimensional theory with four-fermion interactions which is
78 asymptotically free. The fermion field has  $8N$  components. The model
79 was originally considered in the  $\epsilon$ -expansion. The massless
80 formulations, with discrete or continuous symmetry, have been
81 extensively studied for zero or for finite temperatures and densities
82 \cite{rosenstein_dynamical_1981}, giving rise to several discussions
83 related to the low dimensionality of the model, with its implications
84 for symmetry breaking and phase transitions, and to the validity of
85 the  $\epsilon$ -expansion (many aspects have been already discussed in
86 ref. \cite{rosenstein_dynamical_1991}).
87
88
89 \noindent
90 \subsection{Discrete symmetry}
91
92 Let us summarize in a very schematic way the main known results. The
93 Lagrangian is
94 \begin{equation}\label{eq:lag}
95 \mathcal{L}=\bar{\psi}(\not{\partial}+i\not{a}\sigma_3)\psi+\frac{1}{2}(\partial\psi)^2+\frac{g}{2}\psi^4
96 \end{equation}
97
98 (for studies of the limit  $0\rightarrow\infty$  in  $1/\epsilon$  one will also define
99  $g\rightarrow 2N\lambda$ ). It is invariant under the discrete chiral symmetry
100
101 \begin{equation}
102 \psi\rightarrow i\gamma_5\psi.
103 \end{equation}
104
105 \begin{subequations}
106 \begin{equation}
107 \mathcal{N}=\int d^2x\left[-i\bar{\psi}\left(\gamma^1\frac{\partial}{\partial x_1}+\gamma^2\frac{\partial}{\partial x_2}\right)\psi-\frac{g}{2N}\bar{\psi}\psi\bar{\psi}\psi\right],
108 \end{equation}
109 \end{subequations}
110
111  $\psi$  - spinor;  $\bar{\psi}=\psi^\dagger\gamma^0$  - adjoint spinor
112 (Pensira et al., 1999)
113 (Drut et al., 2010; Gracey, 1994a; Herbut, 2006; Vasil'ev et al., 1993)

```

Table of Contents:

1. Compare two examples
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3. Correlation function
 - (Gracey, 1994b, 1999)
 - (Polini *et al.*, 2013)
 - (Marbar, 2007)
 - (Abdalla *et al.*, 2001; Economou, 2006; Negele and Orland, 1998; Wall and Carr, 2013; Zee, 2010)
 - (Nambu and Jona-Lasinio, 1961a,b)
 - Diagrams (Fujita and Sekiguchi, 1995)
 - (Castro Neto and Fradkin, 1993; Chubukov *et al.*, 1994; Raçon *et al.*, 2013; Sachdev, 2011)
 - (Cayssol, 2013; Chamati and Tonchev, 2011; Moshe and Zinn-Justin, 2003)
 - (Gross and Neveu, 1974; Witten, 1978a,b, 1980)
 - (Kleiner and Babaev, 1998; Shankar, 1994)
 - (Bogolyubov (Jr) *et al.*, 1984; Sheehy and Schmalhan, 2007)

Message Log:

```

Process exited normally.
Process exited normally.
Process started: latex-interaction=nonstopmode "K12974".tex
Process exited normally.
Process started: dvi2ps -T tight -D 120 "K12974".dvi
Process exited normally.

```

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Environment

```
\begin { name }
```

```
Content of the environment.
```

```
\end { name }
```

name – name of the environment.

Examples:

- document
- equation
- figure
- theorem
- ...

Commands

```
\commandname [ options ] { argument }
```

- Argument in braces are mandatory
- Option in brackets are not

Example:

```
\includegraphics [ rotate =90 ] { fig . png }
```

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The spaces in

- How are you?
- How are you?
- How are you?

play no role. The output is always

How are you?

i.e. spaces between words and tabs are ignored.

In a similar fashion one or more blank lines are regarded as as one blank line.

Special characters

The characters

`%, #, $, &, ~, _, ^, \, {, }`

are special in the sense that if you want to produce them, you need some special code.

For example:

- “`\&`” stands for `&`
- “`\%`” produces `%`
- “`\$`” for `$`
- ...

Beware

To produce `\` you need to type `\backslash`.

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PSTricks: Drawing figures with \LaTeX

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