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ABSTRACT

Abstract in English.

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Keywords in English

Author's Declaration

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Author's ID:	007
Paper type:	Semestral Project
Academic year:	2032/33
Topic:	Title of Student's Thesis

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*The author signs only in the printed version.

ACKNOWLEDGEMENT

I would like to thank the advisor of my thesis, Ing. XXX YYY, Ph.D. for his/her valuable comments etc.

Contents

List of Figures

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Listings

Introduction

Here comes the introduction of the thesis, for example...

This thesis is devoted to DSP (Digital Signal Processing), especially it analyses the effect happening when the Nyquist condition for *sampling frequency* (f_s) is not satisfied.[1]

The template is set to twoside printing by default. Do not be surprised that you find empty pages in your PDF. They are there to make the chapters and other important stuff begin on the right side when the document is printed. Having a serious reason to print one-sided, please switch the option `twoside` to `oneside`!

[1] This sentence is only to demonstrate how abbreviations can be used and typeset.

Aim of the thesis

Specification of the objectives to be solved in the thesis. If your study program does not insist on having such a separate chapter with the aims, please specify them as a part of the Introduction.

1 Theory

Theoretical background of the thesis comes now, suitably split into chapters and sections.

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2 Thesis Results

Practical part and results of the student, suitably split into chapters and sections.

2.1 Selection of Programming Language

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2.2 Implementation

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2.2.1 Tests and Evaluation

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Conclusion

Thesis conclusion.

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Symbols and abbreviations

Width of the left column of this list	is governed by the width of the parameter of `acronym` (see row 1 of the listing at page 41)
HowMuchSpace	only to demonstrate how the space of the left column is reserved
DSP	Digital Signal Processing
f_s	sampling frequency

List of appendices

A Selected Commands of `thesis` Package

A.1 Quantities and Units

Tab. A.1: An overview of commands (use within the mathematical environments).

Command	Example	LaTeX code of example	Meaning
`\textind{...}`	$\beta_{\max}$	`$\beta_\textind{max}$`	text-style index
`\const{...}`	U_{in}	`$\const{U}_\textind{in}$`	constant
`\var{...}`	u_{in}	`$\var{u}_\textind{in}$`	variable
`\complex{...}`	$\boldsymbol{u}_{\mathrm{in}}$	`$\complex{u}_\textind{in}$`	complex variable
`\vect{...}`	$\mathbf{y}$	`$\vect{y}$`	vector
`\mat{...}`	$\mathbf{Z}$	`$\mat{Z}$`	matrix
`\unit{...}`	kV	`$\unit{kV}$` or `\unit{kV}`	unit

A.2 Symbols

- `\E`, `\eul` – typesets the Euler number: e,
- `\J`, `\jmag`, `\I`, `\imag` – imaginary unit: j, i,
- `\dif` – the differential: d,
- `\sinc` – the function sinc,
- `\mikro` – typesets the *micro* symbol in roman type[1]: µ,
- `\uppi` – typesets π (greek pi in roman type, in difference to `\pi`, which typesets π).

All symbols are considered to be used within a math mode, except `\mikro` that is possible in the text mode as well.

[1] the symbol comes from package `textcomp`

B Next Appendix

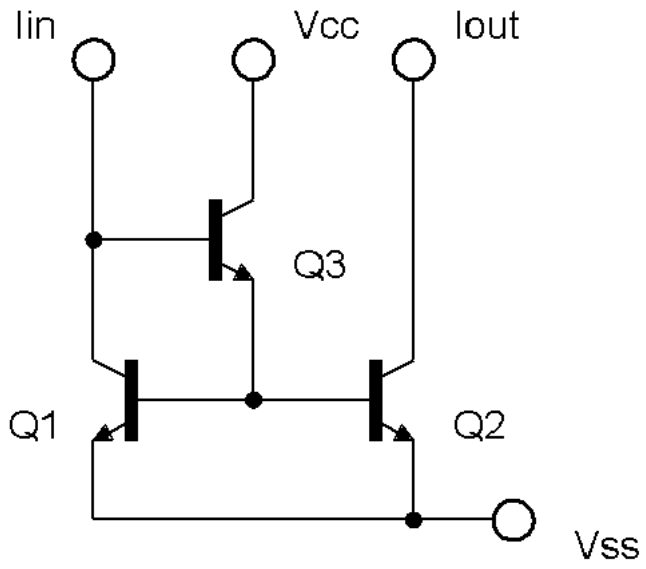

Fig. B.1: Improved Wilson current mirror.

For inclusion of the vector-based graphics directly via LaTeX, it is possible to use the `TikZ` package. Examples of use can be found at the TeXample site. TikZ graphics creation is supported in QTikz and TikzEdt software.

C Examples of Listing Computer Codes

C.1 Package `listings`

Listing computer codes can be handled efficiently via the `listings` package. This package introduces a new environment `lstlisting` for typesetting computer codes, as for example:

```
\section{Package lstlistings}
Listing computer codes can be handled efficiently
via the \texttt{listings} package.
This package introduces a new environment
\texttt{lstlisting} for typesetting computer codes.
```

The package supports a number of programming languages. The code to be typeset can be input directly from files on disk. The package allows row numbering and extracting only selected parts of the code. The following paragraph is an example of the use of `listings`:

Abbreviations are typeset with the `acronym` environment:

```
6 \begin{acronym}[HowMuchSpace]
```

The width of the input parameter, `HowMuchSpace`, determines the width of the first column. An example of the definition of abbreviation f_s is in Listing C.1.

Listing C.1: Example of code listing.

```
21   \acro{symfs}              % label of the abbrev.
22     [\ensuremath{f_\textind{s}}]  % symbol
23     {sampling frequency}          % full text
```

The list is finished with the end of the environment:

```
26 \end{acronym}
```

Listing C.2 contains an example of code for Matlab, whereas in Listing C.3 you find an example in the C language.

Listing C.2: Example of the Schur–Cohn test of stability in Matlab.

```
%% Priklad testovani stability filtru

% koeficienty polynomu ve jmenovateli
a = [ 5, 11.2, 5.44, -0.384, -2.3552, -1.2288];
disp( 'Polynom:'); disp(poly2str( a, 'z'))

disp('Kontrola pomoci korenu polynomu:');
zx = roots( a);
if( all( abs( zx) < 1))
    disp('System je stabilni')
else
    disp('System je nestabilni nebo na mezi stability');
end

disp(' '); disp('Kontrola pomoci Schur-Cohn:');
ma = zeros( length(a)-1,length(a));
ma(1,:) = a/a(1);
for( k = 1:length(a)-2)
    aa = ma(k,1:end-k+1);
    bb = fliplr( aa);
    ma(k+1,1:end-k+1) = (aa-aa(end)*bb)/(1-aa(end)^2);
end

if( all( abs( diag( ma.'))))
    disp('System je stabilni')
else
    disp('System je nestabilni nebo na mezi stability');
end
```

Listing C.3: Example of implementation of first canonical form in C.

```
// first canonical form
short fxdf2t( short coef[][5], short sample)
{
  static int v1[SECTIONS] = {0,0},v2[SECTIONS] = {0,0};
  int x, y, accu;
  short k;

  x = sample;
  for( k = 0; k < SECTIONS; k++){
    accu = v1[k] >> 1;
    y = _sadd( accu, _smpy( coef[k][0], x));
    y = _sshl(y, 1) >> 16;

    accu = v2[k] >> 1;
    accu = _sadd( accu, _smpy( coef[k][1], x));
    accu = _sadd( accu, _smpy( coef[k][2], y));
    v1[k] = _sshl( accu, 1);

    accu = _smpy( coef[k][3], x);
    accu = _sadd( accu, _smpy( coef[k][4], y));
    v2[k] = _sshl( accu, 1);

    x = y;
  }
  return( y);
}
```

D Content of the electronic attachment

An electronic attachment is often a part of the thesis. The attachment is uploaded in the BUT information system together with the thesis PDF. Please use an appropriate file format for the attachment.

It is suggested to comment on every folder, to specify which of the files contains main settings, to specify which is the main or executable file, what was the setting of the compiler etc. It is also valuable to specify in which version of the software the code has been tested (e.g. Matlab 2018b). In the case that hardware has been created within the thesis, the electronic attachment must contain all documentation (for example Eagle files with the printed circuit board layout).

If your attachment contains a lot of files or folders, LaTeX package `dirtree` can become handy, as in the following example.

```
/ ..... root of the attached archive
├── logo ..... logotypes
│   ├── BUT_abbreviation_color_PANTONE_EN.pdf
│   ├── BUT_color_PANTONE_EN.pdf
│   ├── FEEC_abbreviation_color_PANTONE_EN.pdf
│   └── UTKO_color_PANTONE_EN.pdf
├── pdf ..... PDFs (generate them in the information system)
│   ├── assignment-example.pdf
│   ├── cover-example.pdf
│   └── titlepage-example.pdf
├── pict ..... other graphic files
│   ├── soucastky.png
│   ├── spoje.png
│   ├── ZlepseneWilsonovoZrcadloNPN.png
│   └── ZlepseneWilsonovoZrcadloPNP.png
├── text ..... LaTeX source codes of the text
│   ├── abbreviation.tex
│   ├── appendix.tex
│   ├── bibliography.tex
│   ├── conclusion.tex
│   ├── introduction.tex
│   ├── results.tex
│   └── solution.tex
├── template-thesis.tex ..... main file of the thesis
├── template-presentation.tex ..... main file of the slides for presentation
└── thesis.sty ..... package for typesetting final theses at BUT
```