

How to use \LaTeX formatting with IEEE template

Mr. Dilip D S

Junior Research Fellow
Department of Science and Humanities
R.M.D. Engineering College
Kavaraipettai - 601 206, Tamil Nadu, S.India.
e – mail : mr.dilipmaths@rediffmail.com

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- TeX is essentially a Markup Language (like HTML, XML and RTF)
- TeX written by Donald Knuth in 70s -A revolution in typesetting
- Latex is an extension of TeX Macro packages to make TeX easier to use

- High typeset quality
- Easy to include math formulas
- Good for large documents
- Minimizes the drudgery of formatting, numbering, and referencing.

Disadvantage: Steep Learning Curve

SUMS AND PARTIAL SUMS OF GENERALIZED FACTORIAL

M.Maria Susai Manuel, D.S.Dilip
 Department of Science and Humanities,
 R.M.D. Engineering College,
 Kavaraipettai - 601 206, Tamil Nadu, S.India.
e-mail : manuelmsm_03@yahoo.co.in

Abstract

In this paper, authors obtain some results on generalized polynomial factorial using generalized difference operator of first kind Δ_ℓ and second kind $\Delta_{\ell,\ell}$, for the positive real ℓ . Also we derive the formulae for the sums and partial sums of generalized polynomial factorial in number theory using inverse operators. Suitable examples are provided to illustrate the main results.

Key words: Generalized difference operator, generalized polynomial factorial, Partial sums.

AMS Classification [2000]: 39A

1.Introduction

In number theory, some applications, like sum of the n^{th} powers of an arithmetic progression, the sum of the products of n consecutive terms of an arithmetic progression and the sum of an arithmetico-geometric progression are developed in [2] using the generalized difference operator Δ_ℓ defined as $\Delta_\ell u(k) = u(k+\ell) - u(k)$. Generalized Bernolli's polynomials $B_n(k, \pm\ell)$ using $\Delta_{\pm\ell}$ are established in [4,5]. Qualitative behaviors, like rotatory, spiral, boundedness, recessive and dominant properties of the generalized Ricatti's equation $p(k)u(k+\ell) + p(k-\ell)u(k-\ell) = q(k)u(k)$, $k \in \mathbb{N}(\ell)$ for integers ℓ and $-\ell$ are developed in [3,6,7,8]. Sums and sums of partial sums of higher powers, products of consecutive terms of an arithmetic progression is established in [9]. But sums or sums of partial sums of generalized factorial are not yet developed in the literature. Hence in this paper we develop results and applications on generalized factorial.

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1. INTRODUCTION

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- L^AT_EX implementations exist for all platforms (DOS, Windows, Unix,..)
- Scientific Workplace -(Commercial Package).
- MikTeX - Basic software.
- WinEdt, **TeXnicCentre**, LEd, etc.
- Download MikTeX:<http://miktex.org/2.9/setup>
TeXniccenter:<http://www.texniccenter.org/>

- Create a text file (with your favorite text editor) with LaTeX commands.
- Compile or Build your document using the LaTeX program.
- Display resulting Document in pdf or ps or dvi.

- **Document Class** Predefined Formats (article, report, book,..).
- **Packages used** Added Functionality (graphicx, hyperref,...).
- **Main Body** Text and Bibliography References.

Changing the document styles

- `\documentclass[options]{article}`
- `\documentclass[options]{book}`
- `\documentclass[options]{letter}`
- `\documentclass[options]{amsart}`
- `\documentclass[options]{thesis}`
- `\documentclass[journal]{IEEEtran}`
- `\documentclass{elsarticle}`

Options: 10pt, 11pt, 12pt, a4paper, leqno, onecolumn, twocolumn, oneside, twoside, landscape, etc.

Example

```
\documentclass[12pt,journal,compsoc]{IEEEtran}
```


Basic Packages

General format: `\usepackage{package1,package2,...}`

Packages: `hyperref, graphicx, multicol, pstricks, amsthm, amsfonts, amssymb, amsmath, etc.`

IEEE Packages

Packages: `ifpdf, cite, algorithmic, array, mdwmath, mdwtab, eqparbox, subfigure, caption, subfig, fixltx2e.`

- **Start with** `\begin{document}`
- **End with** `\end{document}`
- **Typesetting Text**
 - `\\` or `\newline` and `\newpage`
 - **Bold:** `\textbf{...}` or `\bf`
 - **Italics:** `\emph{...}` or `\textit{...}` or `\it`
 - **Underline:** `\underline{...}` or `\ul`

quote.tex

```
\documentclass{article}
\begin{document}
Imagination is the eye of the soul.
\end{document}
```

Output of quote.tex

Imagination is the eye of the soul.

Titles, Authors and others

- `\title{Bare Demo of IEEEtran.cls for Journals}`
- `\maketitle`
- `\author{Michael~Shell,~
 \IEEEmembership{Member,~IEEE}}`
`\thanks{M. Shell is with the Department of
Electrical and Computer Engineering, Georgia
Institute of Technology, Atlanta, GA, 30332 USA
e-mail: (see
http://www.michaelshell.org/contact.html).`
`\thanks{J. Doe and J. Doe are with Anonymous
University.}`

```
\begin{abstract}
```

In scientific publications it is customary to start with an abstract which gives the reader a quick overview of what to expect. LATEX provides the abstract environment for this purpose. Normally abstract is used in documents typeset with the article document class.

```
\end{abstract}
```

Output

Abstract

In scientific publications it is customary to start with an abstract which gives the reader a quick overview of what to expect. LATEX provides the abstract environment for this purpose. Normally abstract is used in documents typeset with the article document class.

Sections

- `\chapter{Mechanics}` **To be used with book and thesis document classes**
- `\section{IC Engines}`
- `\subsection{Two Stroke Engines}`
- `\subsubsection{Two Stroke Petrol Engines}`
- `\section*{Acknowledgment}`

Font Size

- `\tiny \scriptsize \footnotesize`
- `\small \normalsize`
- `\large \Large`
- `\LARGE \huge`
- `\Huge`

Bullets: Format

```
\begin{itemize}  
\item Text 1  
\item Text 2  
\end{itemize}
```

Bullets: Output

- Text 1
- Text 2

Numbering: Format

```
\begin{enumerate}  
\item Text 1  
\item Text 2  
\end{enumerate}
```

Numbering: Output

- (1) Text 1
- (2) Text 2

Format

```
\begin{enumerate}  
  \item[(i)] Text 1  
    \begin{itemize}  
      \item IText 1  
      \item[-] IText 2  
    \end{itemize}  
  \item[(ii)] Text 2  
    \begin{description}  
      \item[RMD] DText 1  
      \item[RMK] DText 2  
    \end{description}  
\end{enumerate}
```

Output

(i) Text 1

- IText 1
- IText 2

(ii) Text 2

RMD DText 1

RMK DText 2

Alignment

```
\begin{flushleft}
Riccati difference equations...
\end{flushleft}
\begin{center}
Riccati difference equations...
\end{center}
\begin{flushright}
Riccati difference equations...
\end{flushright}
```

Output

Riccati difference equations...

Riccati difference equations...

Riccati difference equations...

`~`, `\`, `\quad`, `\qquad`, `\indent`, `\noindent`

Example

sums or sums $x^2, \sim y^2, \backslash z^2$ of partial sums of x^2, y^2, z^2 generalized factorial.

sums or sums x^2, y^2, z^2 of partial sums of x^2, y^2, z^2 generalized factorial.

`\indent` sums or sums of partial sums of generalized factorial.

`\quad` sums or sums of partial sums of generalized factorial.

`\qquad` sums or sums of partial sums of generalized factorial.

sums or sums of partial sums of generalized factorial.

sums or sums of partial sums of generalized factorial.

sums or sums of partial sums of generalized factorial.

- α, β, γ
- $$\sum_{r=0}^{\infty} \frac{u(x-r\ell)^3}{\sqrt{\alpha_{i,j}^2 - 2r\ell}} = f(x, \Delta_\ell u(k))$$
- \dots

$$\sum_{r=0}^{\infty} \frac{u(x-r\ell)^3}{\sqrt{\alpha_{i,j}^2 - 2r\ell}} = f(x, \Delta_\ell u(k))$$

- \dots

$$\sum_{r=0}^{\infty} \frac{u(x-r\ell)^3}{\sqrt{\alpha_{i,j}^2 - 2r\ell}} = f(x, \Delta_\ell u(k))$$

- $$\sum_{r=0}^{\infty} \frac{u(x-rl)^3}{\sqrt{\alpha_{i,j}^2 - 2rl}} = f(x, \Delta_{\ell} u(k))$$

$$\sum_{r=0}^{\infty} \frac{u(x-rl)^3}{\sqrt{\alpha_{i,j}^2 - 2rl}} = f(x, \Delta_{\ell} u(k)) \quad (1)$$

- $$\dots \tag{22}$$

$$\sum_{r=0}^{\infty} \frac{u(x-rl)^3}{\sqrt{\alpha_{i,j}^2 - 2rl}} = f(x, \Delta_{\ell} u(k)) \quad (22)$$

Declaration Part

- `\newtheorem{thm}{Theorem}[section]`
- `\newtheorem{lem}{thm}{Lemma}`
- `\newtheorem{exm}{thm}{Example}`
- `\newtheorem{defn}{thm}{Definition}`
- etc

Applying Theorem

```
\section{Introduction}
```

```
\begin{thm}\label{thm1}
```

If $f(x) \leq g(x) \dots$, and if $\lim_{x \rightarrow a} f(x) = L$ and $\lim_{x \rightarrow a} g(x) = M$ then $L \leq M$.

```
\end{thm}
```

Output

Theorem 1.1

If $f(x) \leq g(x) \dots$, and if $\lim_{x \rightarrow a} f(x) = L$ and $\lim_{x \rightarrow a} g(x) = M$ then $L \leq M$.

Applying Definition

```
\section{Calculus}
\begin{defn}\label{de1}
Let  $L$  be a finite number. To say that
 $L = \lim_{x \rightarrow a} f(x)$  means  $\forall \epsilon > 0, \exists \delta > 0$  such that whenever
 $0 < |x - a| < \delta$  then we must have
 $|f(x) - L| < \epsilon$ .
\end{defn}
```

Output

Definition 2.1

Let L be a finite number. To say that $L = \lim_{x \rightarrow a} f(x)$ means $\forall \epsilon > 0, \exists \delta > 0$ such that whenever $0 < |x - a| < \delta$ then we must have $|f(x) - L| < \epsilon$.

General format: `\ref{marker}`

Example

We have used two equations, Equation `\ref{eq1}` and `\ref{dq1}`, One theorem, Theorem `\ref{thm1}` and one definition, Definition `\ref{de1}`

Output

We have used two equations, Equation 1 and 22, One theorem, Theorem 1.1 and one definition, Definition 2.1

Columns

General format:

```
\begin{tabular}{|<C.a1n1>|<C.a1n2>|...|}  
body of the table  
\end{tabular}
```

Cell Alignment: l, r, c, p. eg. p{4.7cm}

Rows

& - Split text into columns

\\ - End a row

\hline - Draw line under row

Example

```
\begin{tabular}{|c|l|l|l|}  
\hline  
Sl.no&Date&Price&Kg\\  
\hline  
1&21.01.2012&5000&25\\  
\hline  
2&23.01.2012&4000&20\\  
\hline  
\end{tabular}
```

Output

Sl.no	Date	Price	Kg
1	21.01.2012	5000	25
2	23.01.2012	4000	20

Example

```
\begin{table}[tp]
\caption{List-Jan}\label{tab1}
\begin{tabular}{|c|l|l|l|}
:
\end{tabular}
\end{table}
```

Output

Table: List-Jan

Sl.no	Date	Price	Kg
1	21.01.2012	5000	25
2	23.01.2012	4000	20

Example

```
\begin{tabular}{|c|c|c|}  
\hline  
&\multicolumn{2}{c|}{qqq}\\\cline{2-3}  
\raisebox{1.5ex}[0cm][0cm]{100}  
&A&B\\  
\hline  
2000&10&10\\  
\hline  
\end{tabular}
```

Output

100	qqq	
	A	B
2000	10	10

General Format

```
\begin{figure}  
\includegraphics[width=  
<value>pt,height=<value>pt]{filename}  
\caption{Picture Name}  
\end{figure}
```

Example: `\begin{figure}`
 `\includegraphics[width=`
 `200pt,height=20pt]{images.jpg}`
 `\caption{RMD Engg. College}`
 `\end{figure}`

Output



Figure: RMD Engg. College

Example

<code>\begin{pmatrix}</code>	<code>\begin{bmatrix}</code>	<code>\begin{vmatrix}</code>
<code>2&6&9\\</code>	<code>2&6&9\\</code>	<code>2&6&9\\</code>
<code>2&7&5\\</code>	<code>2&7&5\\</code>	<code>2&7&5\\</code>
<code>4&6&5\\</code>	<code>4&6&5\\</code>	<code>4&6&5\\</code>
<code>\end{pmatrix}</code>	<code>\end{bmatrix}</code>	<code>\end{vmatrix}</code>

Output

$\begin{pmatrix} 2 & 6 & 9 \\ 2 & 7 & 5 \\ 4 & 6 & 5 \end{pmatrix}$	$\begin{bmatrix} 2 & 6 & 9 \\ 2 & 7 & 5 \\ 4 & 6 & 5 \end{bmatrix}$	$\begin{vmatrix} 2 & 6 & 9 \\ 2 & 7 & 5 \\ 4 & 6 & 5 \end{vmatrix}$
---	---	---

Format

```
\begin{thebibliography}{widest-item}  
\bibitem[label1]{cite-key1} bib information  
\bibitem[label2]{cite-key2} bib information  
\end{thebibliography}
```

Example

```
\begin{thebibliography}{9}
\bibitem{agar} R.P Agarwal, \emph{Difference
Equations and Inequalities}, Marcel Dekker, New
York, 2000.
\bibitem[Dilip]{dil} M.M.S. Manuel, D.S.Dilip,
\emph{Generalized Nonlinear Difference Equation of
Second Order ...}, J. of Mod. Meth. in Numer.
Math., Accepted.
\bibitem{graf} J.R. Graef, \emph{Oscillation,
nonoscillation, and growth of ...}, J. of Math.
Anal. and Appl., 60(2), (1977), 398 - 409.
\end{thebibliography}
```

REFERENCES

- [1] R.P Agarwal, *Difference Equations and Inequalities*, Marcel Dekker, New York, 2000.
- [Dilip] M.M.S. Manuel, D.S.Dilip, *Generalized Nonlinear Difference Equation of Second Order ...*, J. of Numer. Math., Accepted.
- [2] J.R. Graef, *Oscillation, nonoscillation, and growth of ...*, J. of Math. Anal. and Appl., 60(2), (1977), 398 - 409.

Format

```
\cite{cite-key}
```

Example

Qualitative properties of ... found in `\cite{dil}`.
D.E properties are established in `\cite{agar,graf}`.

Output

Qualitative properties of ... found in [Dilip].
D.E properties are established in [1,2].

Error - F9

`$`, `{`, `\begin{...}`, `\end{...}`, misspelling in commands.

Warnings - F10

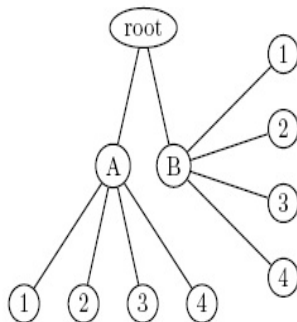
Multiple labeling, referring nonlabel.

Bad box - F11

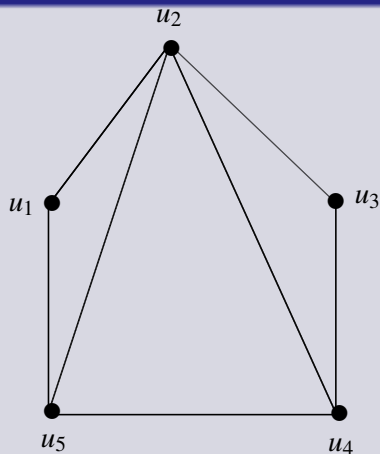
`\\\\`, `\\\\begin{...}`, `\\$$`, `\\\\[`.

Tree Nodes

```
\pstree{\Toval{root}}  
{\pstree{\Tcircle{A}}  
{\Tcircle{1}\Tcircle{2}\Tcircle{3}\Tcircle{4}}  
\pstree[treemode=R]{\Tcircle{B}}  
{\Tcircle{1}\Tcircle{2}\Tcircle{3}\Tcircle{4}}}
```



Network



Data: this text

Result: how to write algorithm with $\text{\LaTeX}2\text{e}$ initialization;

while *not at end of this document* **do**

 read current;

if *understand* **then**

 go to next section;

 current section becomes this one;

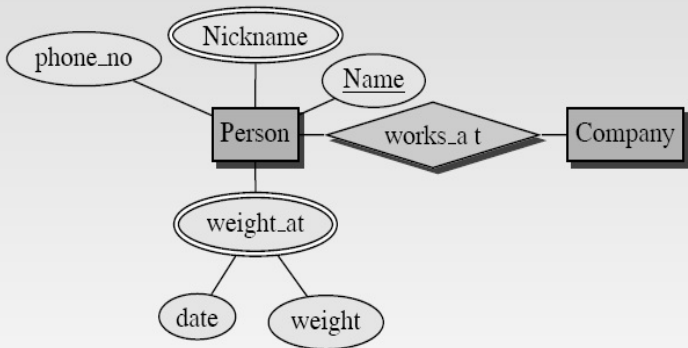
else

 go back to the beginning of current section;

end

end

Algorithm 1: How to write algorithms



Template and other materials can also be downloaded from
www.dilipmaths.yolasite.com

THANK YOU