A Fancy Tutorial for Writing IEEE Transaction Journal Paper in LaTeX

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***Abstract*—Type your Abstract.**

***Index Terms*—Type your Keywords.**

I. INTRODUCTION

HERE is your intro. If you are going to use this Big "H" head, please make efforts to finish this paragraph in three lines. Yes, like what I am doing now.

New Paragraph ...

if you like to enumerate,

1) First item.
2) Second item.

You can change the type of enumerate from 1) to i), or a), or just dot (delete the [1)].). And also you can use other functions like typing math within the enumeration.

a) First item: $\mathbb{G}\alpha b\mathrm{riel}^{is}\mathcal{A}\ N_{ice}\ G_{uy}$.
b) Second item.

`Itemize` is another type of enumerate. It does not requires any package, but can only use dots to present the items.

- First item.
- Second item.

The rest of the paper is fivefold: BlahBlahBlah

II. MATHEMATICAL FORMULATION AND BLAHBLAHBLAH

A. Nomenclature

The major symbol notations used in this paper are presented here. Note that vectors and matrices are represented by bold lower-case and upper-case characters, respectively. Other notations are given throughout the paper if necessary.

1) Sets:

$G\,/\,R\,/\,L$	Conventional generator / transmission line.
$S\,/\,V$	Sending/receiving bus of ℓth transmission line.
C	Generator&bus mapping of gth or rth generator
$X^G\,/\,X^R$	Candidate traditional/renewable generator.
X^L	Candidate transmission line.
T	Planning horizon.

2) Indices:

$g\,/\,r\,/\,\ell$	Conventional generator / renewable generator / transmission line.
d	Demand.
n	Bus.
ω	Scenario.
k	Iteration counter for C&CG algorithm.
o	Iteration counter for L-shaped algorithm.
t	Planning year.

3) Parameters:

$IC^G_{g,t}/IC^R_{r,t}$	Investment cost for gth conventional / rth renewable generator in tth year [$].
$IC^L_{\ell,t}$	Investment cost for ℓth transmission line in tth year [$].
$OC_{g,t}$	Operating cost for gth generator in tth year [$/MWh].
$PC_{d,t}$	Load-shedding cost for unserved load in dth demand in tth year [$/MWh].
$B^G_t\,/\,B^L_t$	Investment budget for generator/transmission line in tth year [$].
$K^G_t\,/\,K^L_t$	Contingency criteria for generator/transmission line in tth year.
$FL_{\ell,t}$	Flow capacity of ℓth transmission line in tth year [MW].
$\overline{PL}^G_{g,t}$	Capacity limit of gth conventional generator in tth year [MW].
$\underline{\Delta}_{n,t}\,/\,\overline{\Delta}_{n,t}$	Angle limit of voltage angle at nth bus in tth year [rad].

4) Uncertain Parameters:

$\overline{PL}^R_{r,t}$	Capacity limit of rth renewable generator in tth year [MW].
$P_{d,t}$	Demand of dth load in tth year [MW].

5) Variables:

$x^G_{g,t}/x^R_{r,t}$	Binary expansion decision for gth traditional / rth renewable generator in tth year. $x=1$ means built; $x=0$ otherwise.
$x^L_{\ell,t}$	Binary expansion decision for ℓth transmission line. $x=1$ means built; $x=0$ otherwise.
$a^G_{g,t}$	Binary outage indicator for gth conventional generator. $a=1$ means outage; $a=0$ otherwise.
$a^L_{\ell,t}$	Binary outage indicator for ℓth transmission line. $a=1$ means outage; $a=0$ otherwise.
$p^G_{g,t}/p^R_{r,t}$	Scheduled power output of gth conventional / rth renewable generator in tth year [MW].
$r_{d,t}$	Load shedding in dth demand in tth year [MW].
$f_{\ell,t}$	Power flow through ℓth transmission line in tth year [MW].
$\delta_{n,t}$	Voltage angle at nth bus in tth year [rad].
η	Dummy variable formulating a relaxed lower bound in the master problem.

B. Problem Description

Here it flies ...

The work of G. Yin and G. Yin is partly supported by Southern Methodist University, U.S.A, under Project DOD-PENTAGON-0001234. (seriously, NO)

G. Yin and G. Yin are with the Lyle School of Engineering, Southern Methodist University, TX, U.S.A. (emails: {gyin, gyin}@smu.edu).

$$\sum_{g}^{X^G} IC_{g,t}^{G} x_{g,t}^{G} + \sum_{g}^{X^R} IC_{r,t}^{R} x_{r,t}^{R} \leq B_t^G, \quad \forall t, \tag{1a}$$

$$\sum_{\ell}^{X^L} IC_{\ell,t}^{L} x_{\ell,t}^{L} \leq B_t^L, \quad \forall t, \tag{1b}$$

Here is an example of auto-numbered align environment:

$$\sum_{g}^{X^G} IC_{g,t}^{G} x_{g,t}^{G} + \sum_{g}^{X^R} IC_{r,t}^{R} x_{r,t}^{R} \leq B_t^G, \quad \forall t, \tag{1}$$

$$\sum_{\ell}^{X^L} IC_{\ell,t}^{L} x_{\ell,t}^{L} \leq B_t^L, \quad \forall t, \tag{2}$$

Here it flies ...

Your new paragraph ...

III. Solution Strategy

BlahBlahBlah...

A. Hi

BlahBlahBlah...

B. Hey

BlahBlahBlah...

C. Algorithm (or so-called Pseudocode)

One paragon algorithm presentation is illustrated in Algorithm 1. You can find other formats in Google.

Algorithm 1 Sample Algorithm Presentation

Initialization: Set $o \leftarrow 0$, $LB_o \leftarrow -\infty$, $UB_o \leftarrow \infty$, $\mathcal{O}_o = \emptyset$.

Step 1. $o \leftarrow o + 1$.

for $d \in D$ **do**:

Step 2. Write normal texts or $\mathbb{MATH}$ $e_u^q ations$.

Step 3. You can even use align or equation enviroments:

$$\alpha = \frac{\log 4^7}{\min_a 6a}; \qquad \boldsymbol{\beta} = -\sum_{\omega} \mathrm{Good}_\omega \mathbf{H}_2^\top \boldsymbol{\gamma}.$$

BlahBlahBlah...

end for

Step 4. Update $UB_o = \min\{UB_{o-1}, \text{whatever}\}$ and $LB_o = \eta^o$. If $\left|\frac{UB_o - LB_o}{UB_o}\right| \leq \varepsilon$, then terminate, declare optimality and report $(\mathbf{x}^o, \mathbf{y}^o)$.

Step 5. If you are an optimization guy like me, you might be familiar with:

$$M = \min_{\mathbf{x},\mathbf{y}} \mathbf{c}_1^\top \mathbf{x} + \eta,$$

subject to

$$\mathbf{H}_1^\top \mathbf{x} + \mathbf{K}_1^\top \mathbf{y} = \mathbf{r}_1,$$
$$\mathbf{A}_1^\top \mathbf{x} \leq \mathbf{b}_1,$$
$$\alpha_d^j + (\boldsymbol{\beta}_d^j)^\top \mathbf{y} \leq \eta / v_d, \quad \forall j \in \mathcal{O}_o, \ \forall d \in D.$$

Let $(\mathbf{x}^{o+1}, \mathbf{y}^{o+1}, \eta^{o+1})$ denote the optimal primal solution.

goto Step 1.

Actually, you can make any pseudocode you want fancy with `adjustwidth` and `\textbf`.

You can even make more subsubsubsubsubsubsection

1) *Go Go Go:* BlahBlahBlah...
2) *Go Go Go:* BlahBlahBlah...

IV. Illustrative Example and Case Studies

TABLE I
Results for Testing Two Methods

Trans. Investment budget [M$]	Silver Bullet Method 1	Silver Bullet Method 2	Silver Bullet Method 3	Werewolf Method 1	Werewolf Method 2	Werewolf Method 3
Transmission expansion	1-5, 4-6	2-3, 2-5 3-5, 4-6	1-2, 2-3, 2-4, 2-5 4-6	1-5, 4-6	1-5, 2-4 2-5, 2-6	1-5, 2-3, 2-4, 3-4 4-6
Generation expansion*	1, 2, 3, 4, 5	2, 4, 5, 6	1, 2, 5	1, 2, 3, 4, 5	1, 2, 4, 6	2, 4, 5
Total cost [M$]	99.16	67.19	56.51	104.57	63.57	59.71
Loss of load rate	6.2%	6.0%	2.1%	7.3%	5.2%	2.1%
Iteration number	7	13	12	8	11	9
Elapsed time [s]	9.2	30.1	27.3	25.4	166.5	110.2

*Number shown in this row indicates the number of bus in which the generator is proposed to be built, and the same below.

A. IEEE 118-bus System

BlahBlahBlah...

V. Conclusion

Using my tutorial file can solve most of the problems in research writings. If you have any concern, just contact me without hesitation!

Appendix A
McCormick Relaxation

BlahBlahBlah...

Appendix B
Semi-convex Jensen's Inequality

BlahBlahBlah...

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