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|---|---|
| Team Number: | apmcm242XXXXX |
| Problem Chosen: | A |

2024 APMCM summary sheet

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This template is located on https://github.com/latexstudio/APMCMThesis. You can update files from the repository.

**Keywords:** Keywords1 Keywords2 Keywords3

# Contents

# I. Introduction

In order to indicate the origin of problems, the following background is worth mentioning.

## 1.1

## 1.2

## 1.3

# II. The Description of the Problem

## 2.1 How do we approximate the whole course of ?

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## 2.2 How do we define the optimal configuration?

1) From the perspective of :

2) From the perspective of the :

3) Compromise:

## 2.3 The local optimization and the overall optimization

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- Virtually:

## 2.4 The differences in weights and sizes of

## 2.5 What if there is no data available?

# III. Models

## 3.1 Basic Model

### 3.1.1 *Terms, Definitions and Symbols*

The signs and definitions are mostly generated from queuing theory.

### 3.1.2 *Assumptions*

### 3.1.3 *The Foundation of Model*

1) The utility function

- The cost of :

- The loss of :
- The weight of each aspect:
- Compromise:

**Figure 1 UTF8gbsn** 关注我们公众号，学习更多知识

3) The overall optimization and the local optimization

- The overall optimization:
- The local optimization:
- The optimal number of :

### 3.1.4 *Solution and Result*

1) The solution of the integer programming: 2) Results:

### 3.1.5 *Analysis of the Result*

- Local optimization and overall optimization:
- Sensitivity: The result is quite sensitive to the change of the three parameters
-
- Trend:
- Comparison:

### 3.1.6 *Strength and Weakness*

**Strength:** The Improved Model aims to make up for the neglect of . The result seems to declare that this model is more reasonable than the Basic Model and much more effective than the existing design.

**Weakness:** Thus the model is still an approximate on a large scale. This has doomed to limit the applications of it.

# IV. Conclusions

## 4.1 Conclusions of the problem

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## 4.2 Methods used in our models

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## 4.3 Applications of our models

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# V. Future Work

## 5.1 Another model

### 5.1.1 *The limitations of queuing theory*

### 5.1.2

### 5.1.3

### 5.1.4

# VI. References

[1] Author, Title, Place of Publication: Press, Year of publication.

[2] author, paper name, magazine name, volume number: starting and ending page number, year of publication.

[3] author, resource title, web site, visit time (year, month, day).

[4] LaTeXUTF8gbsn 资源和技巧学习 `https://www.latexstudio.net`

[5] LaTeXUTF8gbsn 问题交流网站 `https://wenda.latexstudio.net`

[6] UTF8gbsn 模板库维护 `https://github.com/latexstudio/APMCMThesis`

# VII. Appendix

Listing 1: The matlab Source code of Algorithm

```
kk=2;[mdd,ndd]=size(dd);
while ~isempty(V)
[tmpd,j]=min(W(i,V));tmpj=V(j);
for k=2:ndd
[tmp1,jj]=min(dd(1,k)+W(dd(2,k),V));
tmp2=V(jj);tt(k-1,:)=[tmp1,tmp2,jj];
end
tmp=[tmpd,tmpj,j;tt];[tmp3,tmp4]=min(tmp(:,1));
if tmp3==tmpd, ss(1:2,kk)=[i;tmp(tmp4,2)];
else,tmp5=find(ss(:,tmp4)~=0);tmp6=length(tmp5);
if dd(2,tmp4)==ss(tmp6,tmp4)
ss(1:tmp6+1,kk)=[ss(tmp5,tmp4);tmp(tmp4,2)];
else, ss(1:3,kk)=[i;dd(2,tmp4);tmp(tmp4,2)];
end;end
dd=[dd,[tmp3;tmp(tmp4,2)]];V(tmp(tmp4,3))=[];
[mdd,ndd]=size(dd);kk=kk+1;
end; S=ss; D=dd(1,:);
```

Listing 2: The lingo source code

```
kk=2;
[mdd,ndd]=size(dd);
while ~isempty(V)
   [tmpd,j]=min(W(i,V));tmpj=V(j);
for k=2:ndd
   [tmp1,jj]=min(dd(1,k)+W(dd(2,k),V));
   tmp2=V(jj);tt(k-1,:)=[tmp1,tmp2,jj];
end
   tmp=[tmpd,tmpj,j;tt];[tmp3,tmp4]=min(tmp(:,1));
if tmp3==tmpd, ss(1:2,kk)=[i;tmp(tmp4,2)];
else,tmp5=find(ss(:,tmp4)~=0);tmp6=length(tmp5);
if dd(2,tmp4)==ss(tmp6,tmp4)
   ss(1:tmp6+1,kk)=[ss(tmp5,tmp4);tmp(tmp4,2)];
else, ss(1:3,kk)=[i;dd(2,tmp4);tmp(tmp4,2)];
end;
end
   dd=[dd,[tmp3;tmp(tmp4,2)]];V(tmp(tmp4,3))=[];
   [mdd,ndd]=size(dd);
   kk=kk+1;
end;
S=ss;
D=dd(1,:);
```