

# 第八届“认证杯”数学中国

## 数学建模国际赛

### 承 诺 书

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## 第八届“认证杯”数学中国

### 数学建模国际赛

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**Keywords:** Keywords1 Keywords2 Keywords3

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## 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 ?

- 
- 
- 

### 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

- 
- 
- 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.

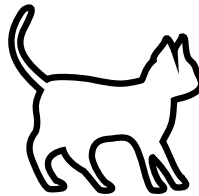
#### 3.1.2 *Assumptions*

#### 3.1.3 *The Foundation of Model*

- 1) The utility function
- The cost of :

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

2) The integer programming According to theory, we can calculate the statistical properties as follows.



**Figure 1 A cat**

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: In despite of this, the model has proved that . Moreover, we have drawn some useful conclusions about . The model is fit for, such as
- Weakness: This model just applies to . As we have stated, . That' s just what we should do in the improved model.

### **3.2 Improved Model**

#### **3.2.1 Extra Symbols**

Signs and definitions indicated above are still valid. Here are some extra signs and definitions.

- 
- 
-

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### 3.2.2 *Additional Assumptions*

- 
- 
- Assumptions concerning the process are the same as the Basic Model.

### 3.2.3 *The Foundation of Model*

- 1) How do we determine the optimal number? As we have concluded from the Basic Model,

### 3.2.4 *Solution and Result*

- 1) Simulation algorithm

Based on the analysis above, we design our simulation arithmetic as follows.

- Step1:
- Step2:
- Step3:
- Step4:
- Step5:
- Step6:
- Step7:
- Step8:
- Step9:

- 2) Flow chart The figure below is the flow chart of the simulation.

- 3) Solution

### 3.2.5 *Analysis of the Result*

### 3.2.6 *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

1)

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- 
- 

2)

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- 
- 
- 

3)

- 
- 
- 
- 

4)



## **5.2 Another layout of**

## **5.3 The newly- adopted charging methods**

# **VI. References**

[1] <https://www.latexstudio.net>

[2] <https://wenda.latexstudio.net>

[3] <https://github.com/latexstudio/CUMCMThesis>

## 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, :);

```