For office use only	Team Control Number	For office use only
T1 ________________	**O Prize Group**	F1 ________________
T2 ________________		F2 ________________
T3 ________________	Problem Chosen	F3 ________________
T4 ________________	**B**	F4 ________________

2018

MCM/ICM

Summary Sheet

We Will Get O Prize(Not U Prize)

Summary

hello world

Keywords: hello; world

Contents

1 Introduction

1.1 Background

In past decades, we' ve got plenty of researches about toll plaza design and operation model which were applied in our life, such as queuing theory, finite s-tate machine princi-ple, and cellular automata model. Actually, the designs were suitable. On 5 Oct. 2016 The New York Times reported that "In an effort to re-duce congestion, tollbooths will be eliminated at all Metropolitan Transportation Authority bridges and tun-nels next year, and replaced with automatic tolling, Gov. Andrew M. Cuomo announced on Wednesday." With the popularity of ETC and automated tollbooths, we need a new model to stimu-late traffic in-cluding accident prevention, throughput and cost. More than this, there will be more and more autonomous (self-driving) vehicles added to the traffic mix which make the traffic more complex than ever. So to accommodate this change, the point is to determine if there are better solutions (shape, size, and merging pattern) than any in common use.

2 Literature review

A statistical test recommends that arrivals at the toll plaza conform to the s-tandard assump-tion of a Poisson process with exponential interarrival times.This is well supported in the literature (Hasofer, 1964; Schwartz, 1974; Grassman, 1980; Green, 1985; Blackwell, 1988).

3 Assumptions

1. There are three options for each vehicle arriving at the toll plaza and each car entered the shortest path of the queue.
2. All the toll booths are same except charge method (width, construction cost e.t.c)
3. The arrival process is Poisson

4 Statement of our Model

4.1 Definition

$$\gamma_i^2 + b^= c^2$$

- h–Conventional (human-staffed) tollbooths
- a–Exact-change (automated) tollbooths
- e–Electronic toll collection booths
- B_i–Number of types i tollbooths
- b_i–Number of type i tollbooths to open, where
- B–Number of tollbooths
- L–Number of main lanes
- l_i–Lower bound for the number of type i lanes to open
- u_i–Upper bound for the number of type i lanes to open
- λ_i–Mean arrival rate for lane type i, where

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Table 1: Definition

- λ–Mean total arrival rate of vehicles at the toll plaza, i.e., the number of arrivals per unit time
- μ_i–Mean service rate for a type i tollbooth, i.e., the number of service completions per unit time
- σ_i–Standard deviation of service time for a type i tollbooth
- W–Mean total waiting time in the queue for all arrivals at the toll plaza
- c_i–The rate of the operating cost of a type i lane
- d–The rate of the operating cost of a type i lane
- c_o–The total operating costs at the toll plaza per unit time
- c_w–The total user-waiting costs at the toll plaza per unit time
- Z–The sum of total operating and user-waiting costs at the toll plaza per unit time
- l–the length of buffer segment
- w–the width of booth
- y_i–Traffic accident prediction

- minimizes the discomfort to the hands, or
- maximizes the outgoing velocity of the ball.

We focus exclusively on the second definition.

- the initial velocity and rotation of the ball,
- the initial velocity and rotation of the bat,
- the relative position and orientation of the bat and ball, and
- the force over time that the hitter hands applies on the handle.

- the angular velocity of the bat,

- the velocity of the ball, and
- the position of impact along the bat.

center of percussion [Brody 1986],

Theorem 4.1. *LaTeX*

Lemma 4.2. *TeX.*

Proof. The proof of theorem. □

4.2 Other Assumptions

-
-
-
-

5 Analysis of the Problem

Figure 1.

$$a^2 \tag{1}$$

$$\begin{pmatrix} *20ca_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} = \frac{Opposite}{Hypotenuse} \cos^{-1}\theta \arcsin\theta$$

$$p_j = \begin{cases} 0, & \text{if } j \text{ is odd} \\ r!\,(-1)^{j/2}, & \text{if } j \text{ is even} \end{cases}$$

$$\arcsin\theta = \oiiint_{\varphi} \lim_{x\to\infty} \frac{n!}{r!\,(n-r)!} \tag{1}$$

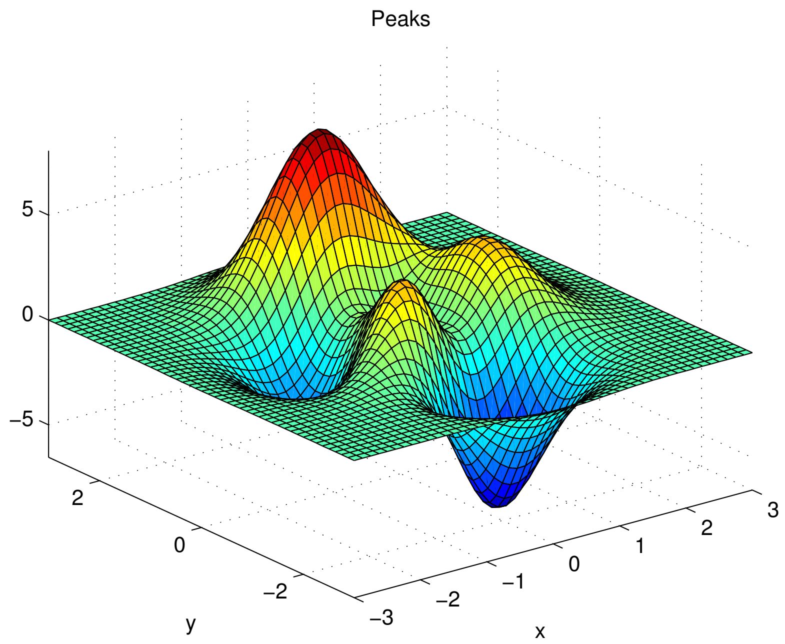

Figure 1: Figure example 1

Figure 2: Figure example 2

Figure 3: Figure example 3

6 Calculating and Simplifying the Model

A_{ij} and A_{ij} 不一样

(123) and $\Phi 123\Psi$ and （123）不一样

7 The Model Results

8 Validating the Model

CTEX中最繁琐的是表格输入,不过数学建模竞赛中，一般要求输入三线表，这样统一格式的情况下，对于输入表格就简单一点了。

双斜杠是强制换行，在矩阵，表格，大括号的公式常用。
关于表格的合并，见下一部分。给出的例子。

Year	theta	S_1^-	S_2^-	S_3^-	S_4^+	S_5^+	S_6^+
2016	1	0	0	0.0001	0	0	0
2017	0.9997	0.0555	0	0.2889	0.1844	0.463	0
2018	0.9994	0	0	0.0012	0.3269	0.7154	0
2019	0.9993	0	0	0	0.4325	1.0473	0
2020	0.9991	0	0	0	0.5046	1.2022	0
2021	0.999	0	0	0	0.5466	1.2827	0
2022	0.9989	0.0017	0	0.3159	0.562	1.2995	0
2023	0.9989	0	0	0.0109	0.5533	1.2616	0
2024	0.9989	0	0	0	0.5232	1.1769	0
2025	0.9989	0	0	0.1009	0.4738	1.0521	0
2026	0.9991	0	0	0	0.4071	0.8929	0
2027	0.9992	0.0004	0	0.1195	0.3248	0.7042	0
2028	0.9994	0.0164	0	0.046	0.2287	0.4902	0
2029	0.9997	0	0	0.0609	0.12	0.2545	0
2030	1	0	0	0	0	0	0

9 Conclusions

年份	指标	
2017	0.9997	0.0555
2018	0.9994	0
2019	0.9993	0

Let's to see Table 2.

年份	指标	
2017	0.9997	0.0555
2018	0.9994	0
2019	0.9993	0

Table 2: NAME

<table>
<tr><td rowspan="2" colspan="2">合并</td><td>测试</td></tr>
<tr><td>0.9997</td></tr>
<tr><td>2019</td><td>0.9993</td><td>0</td></tr>
</table>

年份	指标		
合并	2017	0.9997	0.0555
	2018	0.9994	0
	2019	0.9993	0

10 A Summary

写入你的中文如果你不想显示上面的那段文字，那就把lipsum删掉

获得更多的latex教材，请添加latex交流群，或者关注迈思数模微信公众号：shumohome 并回复“LATEX资料”美赛LATEX模板交流群：193607493 美赛LATEX模板交流群：193607493

11 Evaluate of the Mode

美赛获得更多的latex教材，请添加latex交流群，或者关注迈思数模微信公众号：shumohome 并回复“LATEX资料”美赛LATEX模板交流群：193607493

12 Strengths and weaknesses

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12.1 Strengths

- **Applies widely**
  This system can be used for many types of airplanes, and it also solves

the interference during the procedure of the boarding airplane,as described above we can get to the optimization boarding time.We also know that all the service is automate.

- **Improve the quality of the airport service**
  Balancing the cost of the cost and the benefit, it will bring in more convenient for airport and passengers.It also saves many human resources for the airline.
-

References

[1] D. E. KNUTH The TEXbook the American Mathematical Society and Addison-Wesley Publishing Company , 1984-1986.

[2] Lamport, Leslie, LATEX: " A Document Preparation System ", Addison-Wesley Publishing Company, 1986.

[3] http://www.latexstudio.net/

[4] http://www.chinatex.org/

Appendices

Appendix A First appendix

Here are simulation programmes we used in our model as follow.

Input matlab source:

```
function [t,seat,aisle]=OI6Sim(n,target,seated)
pab=rand(1,n);
for i=1:n
    if pab(i)<0.4
        aisleTime(i)=0;
```

```
    else
        aisleTime(i)=trirnd(3.2,7.1,38.7);
    end
end
```

Appendix B Second appendix

some more text **Input C++ source:**

```
//===========================================================================
// Name        : Sudoku.cpp
// Author      : wzlf11
// Version     : a.0
// Copyright   : Your copyright notice
// Description : Sudoku in C++.
//===========================================================================

#include <iostream>
#include <cstdlib>
#include <ctime>

using namespace std;

int table[9][9];

int main() {

    for(int i = 0; i < 9; i++){
        table[0][i] = i + 1;
    }

    srand((unsigned int)time(NULL));

    shuffle((int *)&table[0], 9);

    while(!put_line(1))
    {
        shuffle((int *)&table[0], 9);
    }

    for(int x = 0; x < 9; x++){
```

```
        for(int y = 0; y < 9; y++){
            cout << table[x][y] << " ";
        }

        cout << endl;
    }

    return 0;
}
```