For office use only	Team Control Number	For office use only
T1 _____	**NEUQ001**	F1 _____
T2 _____		F2 _____
T3 _____	Problem Chosen	F3 _____
T4 _____	**A**	F4 _____

2019
MCM/ICM
Summary Sheet

LaTeX Template for MCM/ICM

The 2014 Ebola virus (EBOV) outbreak in West Africa is so far the largest and deadliest recorded in history. It is thus crucial to better understand the spread of infection and to mitigate the outbreak in the affected countries.

We describe the epidemic using a delayed SEIQR (susceptible-exposed-infective-quarantined-removed) model. We fit the model to the most recent reported data of infected cases and deaths in Sierra Leone and Liberia. To aid in planning for additional disease-control efforts, we introduce Ebola treatment units (ETU) and pulse vaccination in this model. We find that the EBOV epidemic begins to decrease and eventually end if people with Ebola virus can be isolated in ETUs with medical care.

Based on the SEIQR model, we cluster the affected areas with Self-Organizing Map (SOM) neural network. We then formulate a multi-layer dynamic drug distribution model incorporating the results of the SOM clustering, which contributes significantly in controlling epidemic areas with relatively high degree of urgency. With the goals of minimizing the transportation cost and decreasing the unsatisfied demand for the urgency logistics network, we employ the artificial immune system (AIS) to locate the distribution center.chinatex

The main advantage of our approach is that the models utilize clever algorithm allowing us to see clearly how preventions and interventions can mitigate and eventually stop the epidemic. A limitation of our approach is that we constrict the population flow within countries and underlie national epidemic transmission. Results of our models not only support the construction of a medical material delivery system, but also demonstrate the needs for more ETUs to be established, supplied, and staffed.

Key Words: SEIQR Model; Self-Organizing Maps; Immune Algorithm; Deliver System;

Contents

1 Introduction

1.1 Restatement of problems

- 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 1.1. *LaTeX*

Lemma 1.2. *TeX.*

Proof. The proof of theorem. □

1.2 Other Assumptions

D. E. Knuth [1], the author of *the Art of Computer Programming*, is a very famous computer scientist, now living at Stanford University.

2 Analysis of the Problem

It follows that

$$a^2 + b^2 = c^2 \tag{1}$$

The equation (1) has told that

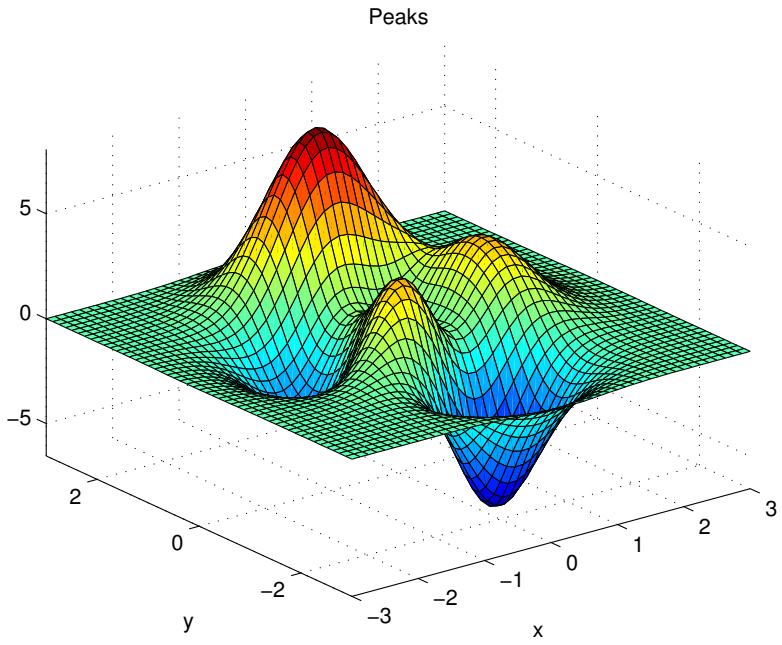

Figure 1: The Curve Plane of System

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

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

$$\arcsin\theta = \oint_{\varphi} \lim_{x\to\infty} \frac{n!}{r!(n-r)!} \tag{23}$$

3 Calculating and Simplifying the Model

Calculating and simplifying the model:

Table 1: A three-line form

sysmtem	Version	Editor
Windows	MikTEX	TEXMakerX
Unix/Linux	teTEX	Kile

4 The Model Results

5 Validating the Model

6 Evaluate of the Mode

7 Strengths and weaknesses

7.1 Strengths

7.2 Weaknesses

8 Conclusions

- **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;
}
```