Problem Chosen	2025 MCM/ICM Summary Sheet	Team Control Number
F		10538

Multi-dimensional Analysis: Identifying the Optimal Selection of Rental and Purchase Plans in Chongqing

Summary

With the increase in urbanization rate and the decrease in the number of births, the sales area of housing in many places has dropped significantly. In this paper, we have adopted **multiple modeling schemes** and established a **multi-dimensional analysis system**, aiming to provide the public with more accurate and cost-effective housing reference plans, and offer reasonable suggestions to the Chongqing government

For task1, we build a **Analytic Hierarchy Process (AHP)** model.By combining the actual situation, establish A, B, and C as the target layer, criterion layer, and sub-criterion layer respectively, and set the corresponding scales. Based on the scales, write the judgment matrix, and then determine the weights of the relevant influencing factors through the eigenvalue method.

For task2, We approach the research from two core dimensions: **the triggering conditions for property replacement** and **the implementation pathways of property replacement.** By constructing a simulation-based decision function, we quantify the weights of respective influencing factors and further deduce the necessity of property replacement.

For task3, we utilize **Grey Model (GM)** to forecast the housing price trends in Chongqing over the next five years.

For task4, We synthesized the findings from the aforementioned tasks and, based on the calculation results of the model, submitted a memorandum outlining project-specific measures to the Chongqing Municipal Government, with the aim of assisting the public in making more informed decisions regarding property rental and purchase.

Keywords: Analytic Hierarchy Process; Multiple Regression Analysis; Grey Model

Contents

1 Introduction

Addison-Wesley Publishing Company, 1986.

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

To model the collision between the ball and the bat, several physical quantities need to be considered:

- 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.

sales area of housing in many places has dropped significantly.

Theorem 1.1. *LaTeX*

Lemma 1.2. *TeX.*

Proof. The proof of theorem. □

1.1 Other Assumptions

- Assumption 1
- Assumption 2
- Assumption 3
- Assumption 4

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2 Analysis of the Problem

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

$$\begin{pmatrix} *3ca_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} = \frac{\text{Opposite}}{\text{Hypotenuse}} \cos^{-1}\theta \arcsin\theta$$

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

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

$$\arcsin\theta = \oiiint_{\varphi} \lim_{x\to\infty} \frac{n!}{r!\,(n-r)!} \tag{2}$$

3 Calculating and Simplifying the Model

Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetuer eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

4 The Model Results

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5 Validating the Model

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6 Conclusions

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7 A Summary

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8 Evaluation of the Model

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9 Strengths and Weaknesses

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9.1 Strengths

- **Applies widely**
  This system can be used for many types of airplanes, and it also solves the interference during the procedure of boarding airplanes. As described above, we can optimize the boarding time. All services are automated.

- **Improve the quality of airport service**
  Balancing costs and benefits, it brings more convenience to airports and passengers, and saves human resources for airlines.

- **High reliability**
  The model is validated through multiple scenarios, ensuring stable performance in practical applications.

References

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

[2] Leslie Lamport. *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

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl. Here are the simulation programs used in our model:

Matlab Source Code:

Appendix B Second Appendix

Some more text. **C++ Source Code:**