# Application of Mathematical Culture in Micro-Dramas: Value, Paths and Prospects

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## Abstract

**As an emerging literary and artistic form in the era of fragmented communication, micro-short dramas are transforming from "traffic-oriented" to "value-oriented". Their lightweight and strong narrative characteristics provide an innovative carrier for the dissemination of mathematical culture. This paper discusses from four dimensions: application value, practical paths, typical cases and development prospects. Through the cross-analysis of practical examples of mathematical applications in film and television, practical experience of mathematical dramas and the logic of hit micro-short dramas, it systematically constructs an integration framework of mathematical culture and micro-short dramas. The research shows that through the path of interdisciplinary integration, the win-win situation between the dissemination of mathematical culture and the refinement of micro-short dramas can be achieved, providing new ideas for the popularization of scientific culture and the innovation of new media content.**

## Keywords

**Mathematical culture, micro-dramas, cultural communication.**

## 1. Introduction

In recent years, relying on the advantages of 1-2 minutes per episode, fast-paced plot design and multi-platform communication characteristics, micro-dramas have quickly occupied the fragmented consumption scenarios of the public. Industry data shows that the retention rate of hit micro-dramas is highly correlated with the design of "golden time nodes". The creation logic of capturing attention in the first 3 seconds, establishing conflicts in the first 10 seconds and forming a closed loop in 3 minutes has become an industry consensus. At the same time, micro-dramas are breaking through the "suspended" creation routine. Realistic themes such as Long Live Love and Going North have achieved both traffic and word-of-mouth success by focusing on social issues, confirming their potential in cultural communication[1].

As an important part of human civilization, mathematical culture includes not only explicit knowledge such as concepts and formulas, but also implicit connotations such as scientific spirit and logical thinking[2]. However, its abstractness often creates communication barriers. Integrating mathematical culture into micro-dramas is not only a response to the creative concept of "slow enlightenment in fast narration" of micro-dramas, but also an innovative attempt to solve the "high and cold" predicament of mathematical popularization. As verified by the 2025 Shanghai Joint Exhibition of Mathematical Dramas, mathematical culture can achieve the communication effect of "being interesting, emotional and loving" through dramatic forms. This interdisciplinary integration logic provides important reference for the creation of micro-dramas[3].

## 2. Core Values of Integrating Mathematical Culture into Micro-Dramas

### 2.1. Enriching the Content Dimension and Ideological Depth of Micro-Dramas

Current micro-dramas have problems such as homogenized themes and stylized plots. Traditional themes such as romance and workplace account for more than 70%[4]. Mathematical culture provides a new creative material library for them. From the practical wisdom of The Nine Chapters on the Mathematical Art to the innovative breakthrough of Nash's Game Theory, from Zu Chongzhi's perseverance in calculating pi to Euler's ingenuity in solving the Seven Bridges Problem, the history of mathematics, stories of mathematicians and mathematical ideas can inject historical depth and rational light into micro-dramas. The mathematical drama The First Encounter between Xu Guangqi and Matteo Ricci performed by the International Department of Shanghai High School shows the theme of cultural integration by reproducing the intellectual dialogue between Chinese and Western mathematicians. This narrative logic can be transferred to micro-dramas, breaking through the limitations of traditional themes and forming a unique knowledge-based narrative style[3].

### 2.2. Innovating the Communication Paradigm of Mathematical Culture

With stories as the carrier, micro-dramas transform abstract mathematical knowledge into concrete plots, which conforms to the public's demand for "immersive learning". Compared with traditional popular science, their "short, flat and fast" characteristics are more suitable for fragmented communication scenarios. Mathematical-related conflicts can attract the audience's attention in the first 3 seconds-for example, the materialized expression of drawing ellipses with thumbtacks and strings in A Mathematician's Holiday can be adapted into the opening scene of micro-dramas to achieve "second-level attention grabbing". This "story + knowledge" communication mode allows the audience to naturally accept mathematical culture in emotional resonance, especially attracting young audiences who have stereotypes about mathematics and expanding the coverage of popular science audiences[5].

### 2.3. Meeting the Dual Needs of Education and Cultural Communication

The Compulsory Education Mathematics Curriculum Standard (2025 Edition) clearly requires "paying attention to the frontier of mathematical discipline development and mathematical culture", emphasizing the cultivation of students' scientific spirit and logical thinking through various forms. As a highly popular media form, micro-dramas can become a supplementary carrier for campus education. Their vivid and interesting presentation can reverse the stereotype of mathematics as "high, cold and obscure". At the same time, the symmetrical beauty, logical beauty and traditional Chinese mathematical wisdom in mathematical culture can convey cultural confidence through micro-dramas. As shown in mathematical dramas such as The Maze World of Pi and The Story of Prime Numbers, teenagers can feel the temperature and charm of mathematics in artistic experience.

### 2.4. Empowering the Industrial Upgrading and Differentiated Competition of Micro-Dramas

Against the background of increasingly fierce competition in the micro-drama market, mathematical culture has become an important breakthrough for differentiated creation. Current hit micro-dramas mostly rely on emotion-driven plots such as "revenge" and "counterattack", while knowledge-based micro-dramas can form a unique track. Referring to the hit structure of "high-energy opening - reversal enhancement - conflict escalation - ultimate explosion", mathematical micro-dramas can take mathematical knowledge as the core of reversal—for example, the protagonist in workplace dramas achieves counterattack through overall planning methods, and solves suspense through logical reasoning in puzzle-solving

dramas. It not only meets the audience's emotional needs, but also provides knowledge increment, improving the communication power and word-of-mouth of the work.

## 3. Practical Paths of Applying Mathematical Culture in Micro-Dramas

### 3.1. Materialization of Explicit Knowledge: Scene Adaptation and Visual Empowerment

For explicit mathematical knowledge such as concepts and formulas, the method of "daily life scenes + visual presentation" is adopted to reduce the understanding threshold. In scene design, learn from mathematical application cases in film and television: in food themes, bloggers allocate ingredients for making cakes according to the golden ratio (1:1.618); in ancient architecture themes, explain the Pythagorean theorem by measuring the bracket structure; in sci-fi themes, simulate the flow trajectory of clouds and fog with parametric equations. In visual presentation, use animation effects to visualize abstract knowledge: such as displaying the arrangement law of Fibonacci sequence with dynamic graphics, and simulating the self-similarity of fractal geometry with particle systems. It not only conforms to the visual communication characteristics of micro-dramas, but also directly conveys the beauty of mathematics[6].

### 3.2. Plot Embedding of Implicit Connotations: Conflict Design and Spirit Transmission

Integrate mathematical ideas and scientific spirit into plot conflicts and character growth to achieve "silent" communication. In plot construction, refer to the idea of promoting the plot through probability calculation in The Wandering Earth 2, allowing the protagonist to solve practical problems through logical reasoning and data analysis-such as identifying fraud by analyzing the behavioral data (probability distribution, statistical laws) of fraudsters in anti-fraud dramas; resolving team conflicts through game theory thinking in workplace dramas. In character shaping, learn from the creative logic of the mathematical drama Hypatia: The Flame of Truth, shape characters adhering to the spirit of "rigor and truth-seeking", and convey the scientific spirit of persistent pursuit of truth through their exploration process, allowing the audience to understand the spiritual core of mathematical culture in emotional resonance.

### 3.3. Aesthetic Presentation of Mathematical Beauty: Composition Innovation and Structure Design

Explore the symmetrical beauty and harmonious beauty in mathematics and transform them into the visual language and narrative structure of micro-dramas. In frame composition, learn from the symmetrical composition and arithmetic sequence scene design of The Grand Budapest Hotel. For example, in traditional culture themes, show the regular repetition of window lattice patterns and the golden section layout of garden paths; in modern themes, design lens movement trajectories using matrix transformation principles to enhance the sense of rhythm of the pictures. In narrative structure, adopt "fractal narrative" or "probability branch" design: such as each small puzzle in puzzle-solving micro-dramas has the same mathematical logic; in multi-ending micro-dramas, design character fate branches using random probability models. It not only enhances the interest of the plot, but also conveys the unity and logic of mathematics.

### 3.4. Interdisciplinary Integration Expression: Theme Expansion and Realistic Concern

Combine realistic issues and diverse themes to expand the application scenarios of mathematical culture. Referring to the design idea of "interdisciplinary theme learning" in mathematical dramas, develop "mathematics + reality" theme micro-dramas: in environmental

protection themes, use proportional calculation to show the effectiveness of pollution control; in educational themes, show core concepts such as equivalence relations and operation laws through "mathematical experiment" scenes; in historical themes, reproduce historical scenes such as Xu Guangqi and Matteo Ricci translating Elements of Geometry and Kepler exploring planetary motion laws. At the same time, integrate art, technology and other elements, such as realizing the motion rendering of virtual characters with linear algebra matrix transformation, making mathematical culture more layered and infectious in interdisciplinary narration.

# 4. Enlightenments from Typical Cases and Practical Challenges

## 4.1. Practical Enlightenments from Relevant Cases

(1)Successful Experience of Mathematical Dramas

Works such as Euler and the Story of the Seven Bridges and The Song of Finite Elements in the 2025 Shanghai Joint Exhibition of Mathematical Dramas have proved that abstract mathematical knowledge can "come alive" through artistic forms through the mode of "historical narrative + character shaping + knowledge visualization". Its creative concept of "making mathematics warm" and the development process of "determining themes - designing tasks - multiple evaluations" provide reference for the collaborative creation of micro-dramas.

(2)Reference Value of Mathematical Applications in Film and Television

The Fibonacci sequence petal bridge in Coco, the Penrose stairs scene in Inception show the integration potential of mathematical elements with visual effects and plot design; the proportional calculation in The Martian and the plot presentation of game theory in A Beautiful Mind provide scene references for the practical application of mathematical knowledge. These cases verify the integration logic of "knowledge accuracy + artistic expression".

(3)Creation Enlightenments from Hit Micro-Dramas

The communication mode of "realistic themes + professional knowledge" and the structural design of "high-energy opening - reversal enhancement" in Red Fruit Drama's Cloud Catcher provide a practical model of "education through entertainment" for mathematical micro-dramas. Data shows that the completion rate of micro-dramas that meet "emotional closure + knowledge increment" is 18% higher than that of purely entertaining dramas.

## 4.2. Main Current Challenges

(1)Balance Dilemma: There is a natural tension between the "short, flat and fast" characteristics of micro-dramas and the rigor of mathematical culture. Over-pursuing entertainment may lead to knowledge distortion (such as simplifying probability principles), while over-emphasizing rigor will lose communication appeal.

(2)Creation Threshold: High-quality mathematical micro-dramas require creators to have both mathematical literacy and film and television creation capabilities. Currently, there is a lack of a collaborative development mechanism of "mathematical experts + film and television teams + educators", resulting in difficulty in ensuring content quality.

(3)Audience Adaptation: Audiences of different ages and knowledge backgrounds have great differences in the acceptance of mathematical content. Teenagers prefer interesting expressions, while adult audiences pay more attention to practical value. It is difficult to design content that "can be reached by standing on tiptoes".

(4)Industrial Support: The profit model of mathematical micro-dramas is not clear, and there is a lack of support policies and evaluation standards for popular science micro-dramas, which affects the enthusiasm of creation.

# 5. Development Prospects and Optimization Suggestions

## 5.1. Constructing a Collaborative Creation Mechanism

Promote the tripartite cooperation of "mathematical experts + film and television creators + educators": mathematical experts are responsible for the review of content rigor to ensure the accuracy of concepts and formulas; film and television creators follow the "second-by-second design" principle to integrate knowledge into plot conflicts and visual presentation; educators participate in audience demand analysis to optimize the popular expression and educational value extraction of content. Referring to the "three-stage and four-step" activity process of mathematical dramas, form a closed-loop mechanism of "content research and development - script creation - shooting and production - communication feedback".

## 5.2. Innovating Narrative and Technological Empowerment

(1)Narrative Model Innovation

Explore the structure of "lightweight knowledge points + strong plot conflicts", focusing on 1-2 core mathematical elements per episode, and enhancing attractiveness through suspense, reversal and other designs. For example, adopt dual-line narrative of "mathematical puzzles + realistic dilemmas", allowing the main plot and knowledge application to promote each other.

(2) Technological Means Empowerment

Use AI animation tools to realize the dynamic deduction of mathematical formulas, and use virtual reality technology to build immersive mathematical scenes (such as 3D modeling of geometric figures); refer to particle systems and partial differential equation simulation methods in film and television special effects to improve the visual expression of mathematical elements.

## 5.3. Segmenting Audiences and Precise Communication

Design differentiated content according to different audience groups: works for teenagers combine campus life and animation elements, such as conveying knowledge through mathematical games and interesting puzzles; works for adult audiences integrate realistic issues such as workplace, anti-fraud and financial management, highlighting the practical value of mathematics. Use platform algorithms to achieve precise push, and push works to users interested in popular science, education and realistic themes to improve communication efficiency. At the same time, develop derivative products of "micro-dramas + supporting teaching plans" to enter the campus education scene and expand the application boundary.

# 6. Conclusion

The integration of mathematical culture and micro-short dramas is a cross-border dialogue between the scientific spirit and popular culture. Through the practical paths of embodying explicit knowledge, dramatizing implicit connotations, aestheticizing aesthetic elements, and integrating interdisciplinary fields, combined with the creation rule of micro-short dramas of "designing by the second", the balance between "entertainment" and "knowledge" can be achieved, allowing the audience to feel the wisdom and beauty of mathematics in fragmented time. Although there are many challenges at present, with the innovation of technical means and the improvement of the industrial ecology, mathematical micro-short dramas are expected to become a new carrier of cultural communication and achieve a win-win situation of cultural value and communication value.

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