

2023 "Huashu Cup" International Mathematical Contest in Modeling

ICM

Problem B: Social Stability Early Warning Study



Background

Human beings, like all animals, have the instinct to seek advantage and avoid harm. The key to humans being the lord of creation is that they are better at avoiding harm than other animals. Crises are always lurking in the future. The history of human development is a history of constant attempts to transcend crisis (Yan Yaojun, 2003). "Thinking of danger in times of peace", measuring and warning social stability, has always been highly valued by far-sighted rulers and politicians.

However, it is not easy to overcome the crisis in the increasingly competitive and crisis-prone modern society. We must rely on modern social measurement science and modern social early warning science. Social measurement and social early warning are closely related. In order to accurately conduct early warning of social crisis, it is necessary to find out several factors affecting social stability.

There are many factors that affect social stability, such as survival security, economic support, social distribution, social control, social psychology, external environment, etc. These factors intertwine and influence each other, and together support all aspects of society. Once there is a large fluctuation in one factor, it will directly or indirectly affect other factors in society, which will lead to unrest or collapse of society.

The peaceful and non-violent regime change movements, named by colors, occurred in several countries and regions at the end of the last century and the beginning of this century achieved their goals by attacking the weakest link affecting social stability. The multiple factors are originally an organic whole, but once there is an imbalance in the ratio of the forces acting on the factors, society become deformed and social stability falters. Then, before the emergence of social stability problems, if you can detect some "traces" in some of the precursors, timely intervention, may be

timely to avoid social risks, to avoid unnecessary social unrest.

So how do you measure social stability? How to judge social risk? It is not only the rulers' first important affairs, but also the most difficult problem for the advisers since ancient times. Political Arithmetic, written by William Pedy in 17th century England, was the first empirical assessment of society; The rise of real empirical social assessment can be attributed to the social indicator movement that started in the United States in the 1960s and quickly spread to other countries, during this period, Aye Tiriakian (1961) proposed a "system of Indicators of social unrest"; F. Hanher (late 1960s) proposed the "Fulander Index"; The New York International Reporting Group (1968-1971) put forward the "Country Risk Guidelines"; Aitz (1960s) proposed the "Index system of Social Instability"; Brzezinski (1989) put forward "National crisis Degree Index"; Chinese scholar Song Linfei (1990) proposed "Social risk Index System"; Niu Wenyuan (2001) proposed the "social combustion theory" and its early warning system for social stability; Yan Yaojun (2003) proposed the "physical model of social stability" and the corresponding index system of social stability. Since then, research on social stability (risk and security) index systems in China has sprung up.

Requirements

Specifically, to address the above questions, your team should consider the following guiding questions:

1. The indicator system of social stability is an important prerequisite for social stability early warning. Selecting indicators that are representative of each can reflect all aspects of social stability comprehensively. Please establish a system of indicators that are likely to affect social stability from both qualitative and quantitative perspectives, and discuss the correlation and causality between them.

2. A stable society requires synergy, checks, and balances among indicators. For example, a society in economic hardship may use the human spirit to compensate for economic deficiencies, which can also make society desperately in need of stability, but only if it can survive. Please consider similar ideas, develop an early warning model of social stability, and discuss.

3. Select a country or region where a color revolution attempted to overthrow the regime, and evaluate its social stability by using the established social stability early warning model. This paper points out the main reasons for the failed color revolution, judges the trend of social stability in the future, and puts forward some suggestions.

4. Please select a country or region where color revolution leads to regime change and point out the main reasons for regime change by using the established social stability early warning model.

5. In order to prevent color revolution and maintain social stability, please put forward relevant suggestions.

Your PDF solution of no more than 25 total pages should include:

- One-page Summary Sheet.

- Table of Contents.
- Your complete solution.
- Reference List.

Note: The ICM Contest has a 25-page limit. All aspects of your submission count toward the 25- page limit (Summary Sheet, Table of Contents, Reference List, and any Appendices). You must cite the sources for your ideas, images, and any other materials used in your report.