Editorial

Editorial for re-scope in 2016

Grey Systems: Theory and Application is now five years old. As an international academic publication from Emerald Group Publishing, edited by the Institute for Grey Systems Studies, and supported by top scholars from around the world, it has played a positive role in promoting the global development of grey system research and its practical applications. Academic exchanges among scholars, and the influence of grey systems theory, extended rapidly due to the journal.

When investigating systems, due to both the existence of internal and external disturbances and the limitations of our understanding, the available information tends to contain various kinds of uncertainty and noise. Along with the development of science and technology and the progress of mankind, our understanding of system uncertainties has gradually deepened, and research on uncertain systems has reached new levels. During the second half of the twentieth century, in the areas of systems science and systems engineering, the seemingly unstoppable emergence of various theories and methodologies regarding uncertainty systems has been notable. Fuzzy mathematics, established by L.A. Zadeh in the 1965, grey systems theory, founded by J.L. Deng in 1982 and rough set theory, formulated by Z. Pawlak in 1982, provide theories and methodologies for describing and dealing with uncertain information from different angles. Fuzzy mathematics, grey systems theory, and rough set theory are three of the most important efforts in the research of uncertain systems during this period.

In fact, traditional and emerging uncertain systems theory and methods are complementary and cannot be clearly separated. Each uncertain systems theory and method has its own strengths and can be used for different kinds of uncertainty problems: such theories complement and supplement each other and are not theoretically incompatible. Many complex, dynamic uncertainty problems are way beyond the scope and capacity of any single uncertain systems theory and method. They require that the researcher combine various kinds of traditional theory with new uncertain systems theories and methods. Further research seeking to develop this kind of interaction, exchange, and combination of relevant theories and methods is essential for the future development of uncertain systems sciences

In 2012, Professor L.A. Zadeh organised an online panel on uncertainty and invited me to write a review paper on grey systems. This article is now available on the website for the Berkeley Initiative in Soft Computing with other review papers of fuzzy mathematics and rough set theory, etc. By common consent, many scholars changed their view that different uncertain systems theories are competitive and as incompatible as oil and water, after learning from each other and this discussion.

The sea can hold the water from hundreds of rivers, it is big because of its capacity. We decided to change the scope of *Grey Systems: Theory and Application* to include work on fuzzy mathematics and rough set theory from the next issue though grey systems theory remains our core focus. Our aims and scope have been amended as follows.

Grey Systems: Theory and Application is devoted to the international advancement of the theory and application of grey systems and uncertainty analysis. It seeks to foster professional exchanges between scientists and practitioners who are interested in the foundations and applications of grey systems and uncertainty analysis.

Through the pioneering work completed over recent years, uncertainty-based techniques such as grey systems theory, fuzzy mathematics, and rough set have become powerful tools in addressing systems with uncertain information. Articles published by the journal will explore the theory and applications of grey systems as well as contributions on hybrid approaches combining grey systems with other uncertainty theories, in order to tackle uncertain information more effectively and efficiently. Our coverage includes, but is not limited to:

- foundations of grey systems theory and other uncertain methods;

- grey sequence operators;

- grey incidence analysis models;

- grey clustering evaluations models;

- techniques for grey system forecasting;

- grey models for decision-making;

- combined grey models;

- hybrid grey-fuzzy or grey-rough models;

- grey input-output models;

- techniques for grey control; and

- applications of grey systems theory and uncertainty analysis.

Grey Systems: Theory and Application provides an opportunity for researchers working in these important areas to present, criticise, and discuss their findings, theories, and ideas with others. Our objective remains for the journal to be a forum of the highest professional quality for both scientists and practitioners to exchange ideas and publish new discoveries on a vast array of topics and issues in grey systems theory and uncertainty analysis. As long as researchers and practitioners in the fields of grey systems and uncertainty analysis believe in their work and are willing to share their results, our journal will work hard to be a reliable gateway for their research and to make it available to the rest of the scientific community.

It is a common responsibility of the editors, authors, readers, and the publisher to run the journal well.

My vision is that the journal will become a window and a garden plot for grey systems and other uncertain research, and become a bridge and a tie to link colleagues of academic circles. I hope that the journal will continue to expand its contribution in developing grey systems theory and uncertainty analysis, and helping it to flourish.

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